Sheriff

1860.

Thesis

On

Some of the most important preventive measures that ought to be employed against epidemics

Highly important with a
matter of composition

Yours, Mrs. Slocum

Good morning, Mr. Shannon.
On The Preventive Measures To Be Employed Against Epidemics.

There is no subject connected with man's temporal welfare more profoundly interesting than that of epidemic diseases. Man, famine, and pestilence, have ever been the great scourges of our race; of these, the last-mentioned is undoubtedly the worst. The progress of civilization is rapidly destituting war of its darker characteristics. In modern warfare our feelings are not shocked by the ruthlessness, the wanton cruelty, the inhuman cruelty, the restlessness in causing loss, pain, and destruction, men to the unoffending, which formerly constituted such marked distinctive features of national conflict. And we may indulge a hope of a 'good time coming' when war shall cease to afflict humanity. Similarly, the progress of humane art and industry, & the development of the bountiful resources of nature, warrant the belief that at some period not very distant, famine shall no more excite fear. But with respect to pestilence, we can scarcely indulge any such hopes of complete exemption from its deadly visitations. Again, the other happen but seldom. Their fury is experienced by a comparatively limited number, but this scourge is almost ceaseless in operation under one form or other; and no class, age, or sex, can claim immunity from its attacks. Britain has had no blood spilt on any battle-field within her own bounds, for more than a
century & the same may be said regarding famine & any
destructive extent, but yearly, monthly, the Registrar's Table,
tell of the ravages of Epidemics, existing before our minds
the Suffering & death caused by these dead enemies of man.

But there have been still more disastrous evils than chol-
ence & death, caused by these visitations of pestilential diseases.
The ignorant multitude seeing, in such seasons, crowds perish-
ing in a manner equally inexplicable,及 extraordinary, some acc-
cused particular persons or classes, of being the originators
or propagators, of the calamity. Hence the persecution which
often swept upon the Jews during the middle ages, & the
massacres of individuals or certain bodies of men who at the
time were obnoxious to popular suspicion or hatred. We are
informed, for example, that in the black death of the 14th
century, the Jews were accused of poisoning the wells, & at
Strasbourg above 2,000 of that ill-fated race were burnt alive;
while at Mayence 10,000 are said to have been put to a cruel
death. In the Great Plague of Milan, in 1630, "no reasoning
could persuade the people that they were not suffering from
the malignant agency of poisoners; it so strong was this notion
that not only common friends, but members of the same fam-
ily, their husbands, & even, grew to be suspicious of each other.

And then amid the light Thespiolence of the 19th Century
similar malignity has not been unknown. The physicians in
Hungary, the agents of government in France, & the monks in
Besides, how mournful the depth of degradation to which
some, in such periods, are dragged by superstitions! How intoler-
able the selfishness into which fear hurries others! How greatly
the exhibition of unbridled vice, which is witnessed in not a
few. The demoralization which too often has resulted from
the prevalence of a continued continuance of some epidemics, is perhaps
the most appalling manifestation of human depravity.
All, be it for the philosopher, the Christian, the physician
should give the subject under our notice the most
attentive consideration.
Spain, were accused of poisoning the wells, and in some instances, murdered by the infuriated multitude. In our country, indeed, such melancholy scenes have not of late been enacted. But it is well known, that on the approach of cholera there arose great alarm, which was providentially moderated by the efforts of the priests, and the exertions of the physicians. Had not such wise measures been taken, the results might have been most deplorable; for we might have seen an awful proof that the ignorant masses, in their blindness and frenzy, still dreadful when goaded into fury by panic terror.

I cannot spare little space to the history of epidemics, and it would be useless to give a dry and barren catalogue of names, places, and dates. I will only remark, that the earliest records of our race, contain accounts of the ravages caused by pestilence. All of us are familiar with the scenes enacted upon the streets before Shimla, when during several days frequent funeral piles of the dead were continually burning. Not less masterly and more trustworthy, is the account which the great historian gives of the plague that devastated Athens. In the pages of historians, poets, and philosophers we have notices of various epidemics which afflicted the ancient world.

In more modern times it is needless to do more than allude to the Black Death in the 14th century, to the Plague of Florence immortalized by the genius of the great Italian painter; to the various epidemics of influenza, Smallpox,
Scarlet Fever; and to The Cholera which like a destroying
angel, havoc over our world, fat multitudes makes a fell swoop.
Under this head I may enumerate a few of the most impor-
tant facts which the history of epidemics involves.

The first of these is the universality of their range. They
appear to have been coeval with the origin of our race: at least
that commencement is lost to our gaze in the dim obscurity
of the remotest antiquity. The names may have changed; the
species of disease may have been modified or altered; but
the characteristics upon which our attention is fixed
remain essentially the same.

And a similar remark may be made regarding the
place of their operation. No part of our world, as far as
we know, are exempt from such visitations. The farthest
field has witnessed the origin of some of the deadliest plagues.
The Black Death commenced its ravages in China. The
farthest east has mourned them fatal sway: Smallpox
has exterminated entire tribes of South American Indians.

And epidemics prevail in the most divine localities.
The densely peopled town may be expected to be a favorite
residence, but the lone cottage is not unfrequently visited.
The mid zone in all its diversities, from burning sand to
rank jungle, is a field of their operation. The colder parts
of the earth enjoy no immunity from their terrible attacks.
India & Russia have some weaknesses to their power of dis-

And epidemics have been prevalent during every known state of the atmosphere—amidst great heat or despite of some cold; during the ceaseless downfall of an Indian monsoon or the dry season when moisture seems utterly exhausted. In our country the epidemics of cholera broke out in the depth of winter & its return was in the middle of summer.

And it seems an established fact that there is often a relation of succession or co-existence between various kinds of epidemic disease. It has been stated that measles or influenza leads the way, one in no long time followed by quinsy, scarlatina; then succeed nervous fevers, diptheria, yellow-fever, plague, cholera. The different seasons & the prevalent conditions of the atmosphere, seem to have a modifying effect on these susceptions.

Another awful fact is the mortality caused by them. The black death is said to have carried off one fourth of the population of the old world. In our own times almost parallel cases may be found in particular localities: thus at Bussorah, one third of the population is said to have fallen victims to cholera, within a few days. Influenza, in very epidemic, has attacked a very large proportion, occasioned very considerable mortality. The deaths from continued fever, scarlatina, small pox, have during the prevalence of epidemics of these
diseases, constituted a very large percentage of the mortality.  
There can be no doubt of the fact, that epidemics of small 
pox, some of late years, become both more frequent and more violent.
It is worthy of notice, that these diseases have not been 
confined to the human species. The plague described by Homer just 
made its appearance among the "Swift dogs," then miles exactly many 
were attacked. Cows and horses have been suffered severely, deer, sheep, 
ducks, poultry, wild birds, when sick seem to be at times the seat 
effects of these marauding influences.

And, lastly, there have frequently been comminical pheno-
mena preceding or attending great epidemics which must force 
notice. For example, violent volcanisation has repeatedly taken 
place, coincident with epidemics. Comets have frequently attracted 
special attention about such periods. Remarkable meteors have 
also been described by scientific observers as appearing on 
similar occasions. Meteorological phenomena are recorded under 
the names of "dust rain, blood rain, blood dew, flesh rain, black 
rain, milk rain, gore rain, acid, thick, stinking gas," etc. Phenomena 
indicative of disturbed conditions of vegetable or animal life 
are repeatedly mentioned. For example, blights of particular trees, 
mildew prevalent in grain, plagues of mice, of locust and other 
mice, attention has been called by observers to the very minute 
amount of electricity, which has once or twice been detected in the 
atmosphere of places, in which cholera was raging, to the fact, that 
the quantity of ozone bears a striking relation to the prevalence of 
certain epidemic diseases.
I will now briefly examine the principal characteristics of epidemic diseases. The most striking of these — that from which the name is derived — is the general and indiscriminate manner in which they attack all classes within the sphere of their influence. The old and the young, the strong and the weak — those who have all the means of procuring comfort, and those whose indigence exposes them to the want even of what may be called the necessaries of life. From the analogy of known cases, they are inclined at first to confine their operations to certain localities, where they spread to other districts, but seldom traversing the world before their fatal march is ended. They have a tendency to become endemic in special places, whose climate favours their progress, or which attract their swarms in active or inoperative form. In India also there are localities where the cholera is endemic. At Bombay it appears in all the monthly reports of mortality, and in our own city of Edinburgh Typhus used to be its endemic plague. And when such diseases, impelled by some mysterious agency, assume an epidemic character, or leave their endemic seats, we are very imperfectly acquainted with the conditions which determine their course, and influence the selection of the places affected by them. Generally speaking, they pass from East to West, but they frequently proceed in other directions — on many occasions, but not invariably
than prosperity may be traced along the banks of rivers, the great highways of human communication. The principal channels of commercial traffic. By joining our attention & cholera, which may be considered an example of epidemic disease, observers state that during its march in India, it attacked chiefly the towns & villages situated in low marshy places, on the banks of rivers or on the shores of the sea; but it was found also to prevail on the banks of river streams which are dry for many months of the year. Itigliaed too in special towns, affecting local points—such as one side of a river, or street, or even particular houses; it attacked particular districts of country, states of territory, even one side of a ship or even a particular class of persons. Then we find it, when in search as it were of the elements necessary for its propagation, travelling with the wind or directly against it, overleaping all barriers opposed by nature or the precautions of terrified humanity; travelling uninhabited places suddenly appearing in a town which it has suddenly abandoned on the occurrence of a copious fall of rain, to reappear in a neighboring situation; spreading men to the sea, it attacking the lonely merchant ships in a position we would imagine one of the most secure from its ravages. In its passage it showed a singular want of uniformity in the rate of its progress, and its general behavior, in that, was such as to lead it to be characterized as irregular, lawless, capricious. But doubtless the more we study the secrets connected with its nature, the wonderful machinery by which its incredible powers of the physical universe, the more will we be impressed with the science of
government & obedience in its case too - of laws which it enforces and unceasingly obeys.

Another general though not universal characteristic of epidemics, is their capability of being propagated by Contagion. This important fact was long disregarded by physicians, even after it had been repeatedly recorded by poets & historians. Indeed the nature and effects of contagious diseases as such, were not carefully examined till the time of Sydenham who studied them with the care & sagacity by which he was distinguished. Since that period some of the ablest men of the profession have treated the subject with the attention it well merits, without, however, coming to the same conclusion. The question respecting the contagious nature of many of epidemics has excited some discussion; the theory being strongly contested by some & strongly contested by others. In our opinion this point admits of indefinite prolongation, as it is hardly possible to demonstrate the contagiousness of such diseases as beyond the point of a very strong probability. The barrier, probably the principal one, seems to be, the non-susceptibility of different individuals to certain maladies. We know that some are incapable of being affected by vaccination, & we are quite warranted in believing, that many receive the same non-susceptibility in regard to other diseases. To the production of any epidemic thus appears to be two elements - incoepetable. The first of these is the prior condition of the body or mind, which has been called the predisposing cause. This is subjective or internal; the other is some material or influence which comes from without & has been
tended to exciting cause. This objective element, this poison, of growth in origin as yet unknown, plants in the air or impregnates matter of various fluids, but demands the internal element or agglomeration of elements for its operation, so that the variations in the intensity of the disease exhibited by different individuals, are owing to their possessing the peculiar conditions of body, in varying degrees of prostration, while those who want its peculiar constitution are happily exempt.

As regards the modes in which contagion acts, they may be included under the following heads.

1. By inoculations, as in the case of small-pox & the plague.
2. By contact, through means of the minute excrescences impregnated with the matter most rater.

a. With the diseased: immediate
b. By family: mediate.

3. By injection - breathing the air polluted by exhalations & from the diseased.

4. Through the emotions - sympathy - imagination.

This last species of contagion is not generally treated of, in medical works, although it is deeply & widely operative. While physical means of propagating disease have had due attention paid to them, those which may be called mental & moral measures have been generally overlooked. Yet all must admit that the cases are neither few nor unimportant, wherein the spiritual elements of our complex being are the means, the media of mission, which the foe uses. For example a community hears that some dread epidemic is
approaching & many of the more trivial are more or less quickly reduced to a state of mental weakness & nervous instability which invite the disease. Again, an epidemic is raging in a certain locality. A considerable proportion of the people feel their spirits subdued & their energies come down, as if the breath of the destroyer was extinguishing the air & his wings were drizzling earth & heaven. And yet again, a person in health stands by the bed of one suffering from cholera. He marks the agony at which nature shrieks, observes the effects at which the sense revive, meets the gaze of the longing, unresting eye. The consequence is, in many cases, an attack of the disease. How who is justified in denying to this process the same character which is given to one purely physical?

But many cases are on record, such as the recurrence of influenza in the fleet of Admiral Hennepflug & two others, which place the theory of contagious communication out of the question. But whether contagious may be one mode of diffusion is not so easily determined—But the fact of epidemics spreading much more rapidly over the a country at the present time, when the means of communication with distant places is so much more speedy than formerly, seems to be the favor of the year that it is so; and there can be little doubt that contagious diseases may differ in their degree of communicability, probably dependent on their potency & volatility—one poison being annihilated & harmless at the distance of twenty feet from the diseased, while that of another may be diluted to invisibility at half that distance.
I now proceed to the cause of epidemics. There are as has been already mentioned, the exciting and the predisposing.

And just as to the exciting cause. A talent within, acting upon cholera, has observed the want will apply to most other epidemics, that, when we view the essential symptoms of cholera, when we deminish the pathological phenomena, finally when we cease to mind the effect of numerous poisonous agents, we see sufficient ground at least to admit the possibility of the entire cause being the operation of a poison on the system. This possibility amounts almost to a certainty, when we remember that all the other causes have been shown to be inapplicable.

"That this poison is we know not. We know that no one understands it;" it is in fact enveloped in the profoundest obscurity. It is always the case where any agent is the subject of mystery, speculation has yielded in theorising about its composition, mode of production &c. It has been supposed to be the product of decaying animal and vegetable matter; many allopathic modifications of the atmosphere itself; peculiar emanations of a terrestrial character connected with volcanic action; connected with mineral impregnation of a poisonous form; actually, produced by vegetable or animal forms, wafted abroad on the wings of the wind. There can be little doubt that such poisons are continually floating about in the air. The Chemistry has not yet succeeded in detecting them. And there can be as little doubt that each separate virus has a definite composition. This view
is supported by the fact of their uniform action; the Smythia poison always attacking the throat emphatically, that of cholera the stomach principally. But why they should do so we know not just as we are ignorant of any reason why drugs should affect certain special parts of the body.

But this it is quite true that we are absolutely ignorant of the exact exciting cause of any one epidemic. That chemists have hitherto failed to detect any unusual element in the atmosphere during epidemics, or observe any unusual product of decomposition which we may consider the exciting cause of them, yet many measurers have advanced abundance of facts in favor of the idea that certain important causes of local atmospheric in-

famy, exercise a powerful influence in originating pestilential epidemics. It is now almost universally believed that certain circumstances are necessary for their causation, since they have been observed frequently to seem under such. These have been classed under the two heads of "seasonal or meteorological causes" and "localizing causes." Of these I once speak in that order. The term "pestilential or epidemic constitution" has been bestowed on certain meteorological phenomena taken in the aggregate, which have mostly accompanied outbreaks of certain epidemics, more especially cholera and yellow fever. These conditions have been found to be, a somewhat variable but elevated temperature—more oppressive than the simple elevation of the thermometer can account for—conjoined with a
certain degree of moisture. But these climatic conditions are rarely, if ever, confined to a limited locality: yet, this is one of the many apparently anomalous facts which so often occur in the history of epidemics, of such places as prove alike in the same season, meteorological influences, some usually escape an epidemic visitation, at the very period when others in the neighborhood are suffering severely from its presence. Happier seasons presenting all the characteristics which conjointly form the especial constitution, have often existed when there has been no accompanying pestilence. Many such instances have occurred during the intervals of epidemic visitation to our own country—they are well known to exist in ordinary years in tropical countries—and Dr. Barton in his report of the sanitary condition of New Orleans, says that the atmospheric cause of pestilence is annually more or less present at that city, without yellow fever or cholera being annual visitants. Such facts evidently point to this conclusion, namely, that there is some other agent—an additional factor—necessary to give energy & character to these seasonal conditions. This in the case of cholera, is what Dr. Barton terms, the "true element," which corresponds with "the localizing causes," of which we have not to speak specially with reference to cholera, but it understood. It would far exceed our proposed limits
to treat of these points in reference to each individual epidemic disease. To do so, however, is quite unnecessary for cholera may be taken as an exemplar of epidemics in general because the available means of prevention are in principle the same as those which are sufficient against typhus, diarrhoea, etc.

Nearly every one admits that local causes of meal- simplicity are necessary for the evolution of every epidemic, but none differ in opinion as to the part they have in the production of the pestilence. These local causes, acting deleteriously on the health of persons exposed to their influence, produce a low tone of the system which unfit it for properly resisting the exciting cause of epidemics. This state of body is the predisposing cause. Dr. Carpenter has put forward the following view in regard to cholera: he believes that no alone influences, referred to, to the causes of a more personal nature, produce a condition of the blood itself which predisposes it for febrile motic action, the precise character of which depends upon the nature of the exciting cause with which it is brought into relation—the special poisons of some specific disease, typhus, or cholera, for example, being each capable of exciting its peculiar fermentation in blood already charged with organic compounds in a state of retrogressive change.
Dr. Carpenter has adduced abundance of facts in favor of the question he has so strongly argued, but the circumstances of persons arriving from a pure atmosphere, it apparently in sound health, showing themselves peculiarly prone to suffer from such a brief exposure to the epidemic influence, seems to be altogether at variance with his opinion, that the supposed condition of the blood is a necessary predisposition for cholera. That such, however, is the case in regard to most other epidemics, especially smallpox, cowpox, purpurial fever &c. where the infecting cause is probably always an inflammatory affection, is very generally admitted.

One of the most recent writers on this subject, Dr. Barlow, considers the local cause of epidemics to be "filth, moisture, stagnant air" &c. what is very possible, especially the emanations arising from extensive upburnings, exposure of a soil impregnated with the results of organic decomposition. In his treatise he has clearly shown that a wide prevalence of epidemic pestilence has uniformly accompanied any extensive disturbances of the soil for the construction of canals, pavements, or other public works. He thus considers cholera to be caused by a peculiar mixture of indigenous growth.

Others believe that the ferment is from without, setting up a peculiar decomposition in the impure soil, the result of which is the cholera poison—the ferment being, as Dr. Barlow believes,
The matter of the dejections of cholera patients—
without entering into the consideration of the foregoing
facts, which would be an inquiry unprofitable
in its nature, I proceed to notice the local conditions that
have been improved to favor the development of
epidemic disease. There are numerous of great
importance within the reach, at least to a great degree,
of prophylactic measures. These local conditions are defective
house ventilation, overcrowding of houses which occurs
to such an extent in unhealthy districts of all large towns;
dampness; cold; impure water; defective drainage;
want of personal cleanliness; poverty; baseness of
site; the effluvia from the decomposition and decay of
the various organic vegetable and animal debris which is
allowed to collect in poor neglected localities; the emanations
from human and animal excreta, whether
accumulated in cesspools, or rolling in foul sewers
and drains; the malaria from quickslime ditches; the miasms
from large frame yards; the stench from the numerous
offensive bone-grinding lights such establishments in
large towns; 
the ill arrangement of streets, blocks of
buildings, closers, yards, back slums etc. It has been
again and again proved that cholera and other epidemics have
been found to prevail under each of these con-

II. B. I speak here of the pre-disposing cause in relation to the body.
ditions, but to say that most of them were necessary adjuncts were to make a most unpardonable statement. For whilst we have seen the thinly peopled houses of the wealthy, attached with great jury, the dance, fowl-smelling, ill-ventilated dwellings of the poor have been spared. A host of such facts that have occurred during the ravages of various epidemics could be easily cited — showing that benighted nations, for their uncleanliness, vermin, etc., have been unassailed, when pestilence was raging everywhere around. Such being the case it will not be deemed excessive if in pure water, looseness of site, the emanations resulting from decaying animal and vegetable refuse, poverty and crowding of houses, be considered the most necessary of the presumed local causes of epidemics.

In the foregoing pages we mentioned incidentally that the predisposing cause of epidemic maladies was a certain condition or one of the system, which inclined it to be acted on by the exciting causes as well as moved by resisting their action. What this condition is we know not — we are ignorant of its precise nature. No man, however, reasonably infers that the general health is, to a greater or less degree, impaired, or that in proportion to the amount of impairments of the system, will be the corresponding severity of the disease which may befall it.
With the foregoing preliminary observations on some of the most important points connected with epidemics, I now proceed to examine the question of the preventive measures that ought to be employed against them.

In former days, when epidemic disease entered a town or city, like a destroying angel avenging broken laws, spared neither age nor sex, striking down the sleeping babe as mercilessly as the strong man, the inhabitants, terror and prayed, looking upon it as a judgment of God against which it was useless to contend. They did not know that forbearance was the necessary result of humane and just sanitary rules. Since then, it has been visitation after visitation of much disease to teach us the important truths, that they are intimately connected with defective hygienic regulations, that they are much of their potency to local, endemic cause that by them Providence designs to teach us the lesson of preventing evil. But it is only since cholera first left its endemic seat on the banks of the Ganges, except the Ægean islands destroying its tens of thousands, that the public mind in our own and other countries, has been aroused to the necessity and importance of sanitary measures and observances. Every visitation has since an impetus to the sanitary movement which has been greatly aided by the different "Commissions" and "Repart" commanded by Government. Sanitary
improvement in our day. New, is daily acquiring more and more importance both in a public and private view; but the main interest in the subject is as yet confined to a few, chiefly of the medical profession or connected with science, a circumstance which by men of narrow minds, is looked upon as suspicions. Some men of any standing in society, heart of all the medical man, can nowadays, with propriety, be ignorant of the principles or practice of the sanitary regulations and observances which are included under the simple modern term of "hygiene".

Sanitary reformations, while necessarily defective in some of our towns, but coincident with its improvement, there is a marked improvement in the health of the inhabitants. The frequent occurrence of epidemic visitation, which within the last hundred years has been becoming less common than of old. In proof of this, above reason, it is stated that in Liverpool, where the mortality was wont to range about 39 per 1000, it is now reduced to 29; 4 in Ely, from 25 per 1000, it has gone down to 17. In Edinburgh, too, the death-rate, from 25 per 1000, in 1855, had gone down to 21 in 1857.

Similar instances might be adduced in regard to the improved health states of almost all of our large towns, a circumstance owing, among other things, chiefly to improved sanitary observances.
In considering the question of prophylactic measures it must be admitted, that as the true nature of the exciting causes of epidemics is quite unknown, our treatment must be founded on a knowledge of their predisposing causes. The most important of these have been already enumerated in a former part of this thesis. Seeing that they are so many departures from the laws of "hygiene," for no specific substance has yet been discovered, as in the case of disease for, for nullifying the same against the deluding it are in most cases for the prevention of such poisons, our chief reliance must be placed upon hygienic sanitary pre-cautions. We must endeavor to get in our present artificial mode of life a nearer approach to a natural one—we must aim at a fusion of as much of the rural as is attainable with the life of the city—so as to combine the advantages of both.

All endeavors after the prevention of epidemics must be founded upon the universal of their predisposing causes. To this point I devoutly wish for, that a general order, it is absolutely necessary that abundance of fresh air should find access to every dwelling. The importance to health of a due supply of this element is becoming every day better understood, but generally neglected. It is certainly a matter of great regret, not only for their own sakes but for that of the community at large, that our poor are so generally, in a measure, compelled to inhabit the crowded and unwholesome dwellings they often do, particu-
N. B. The period is probably not far distant when by the contrivance of some ingenious engineer our large towns shall be supplied with the pure wholesome air of the country, conveyed thereto in some manner similar to the way by which we are supplied with water.
early in large towns. It is in these places, where sanitary arrangements are so defective, that the prevalent epidemic, whatever it be, localizes itself. Where the districts which furnish the cholera patients during an epidemic of cholera are the very same which supply the cases during epidemics of typhus, scarlatina, diphtheria, and in short that generally speaking those districts of our cities are the first to be attacked, the task to be abandoned, by epidemic disease. Amidst the numerous schemes of improvement, in this age of progress, which are going on on every side, no proper advance is made in the way of providing suitable home accommodation for the poor, who need it so greatly; who have their poverty, at the mercy of a set of mercenary landlords, who own the miserable pig-sties, from which they draw their rent. These pig-sties of our town & cities which constitute the unhealthiest part, where the streets are narrow, touching by lofty houses which shut out the air, light, and the allev, close, mean, courts, back-stairs passages are always in a peculiar, or less degree foul, filthy stinking with unsavory effluvia. All mingled at first in the town & cities. In these days, we know that there were strong impelling necessities for their being like Jerusalem of old "compact-built together," but these necessities have now altogether passed away. Instead of using the prosperity of pulling down the old pig-sties as the class of cities & in those stead building houses somewhat worthy of the name, I would rather urge the advantages of turning the town, prosper into what it is evidently meant to be, the workshop that the home of man, of building in the suburbs, on the slopes of neighboring hills, only the sea shore or other suitable spot, "houses
for the working classes—blocks of buildings, or rows of neat, airy cottages, each with its small garden attached—fitted up with common conveniences of every kind, whose workmen may pay home of cleanliness and comfort, at an equally small if not smaller rent, than he now pays for his close tenement in the unhealthiest street. And from these situations branch lines might convey the men to their work by railroad without loss of time, labor, or health. Then as the old foul alleys become gradually depopulated, they may be replaced by park houses and public buildings, etc. Such views may to so-called machine men seem Utopian, but still many hope to realize that this idea will be gradually approach to be realized in numerous portions of our country. As things at present go on in our towns, one almost despair of ever seeing the day when in their center, our workmen will be able to find houses of a description suited to their wants. A true step in this direction is the construction of "model lodging houses" in which working men may find dwellings at a reasonable price, constructed with increased regard to comfort and health. Most of the old houses which our poor inhabit are not good enough for pigs and "a kind of annual auction of old property in the cloths of cities" would be a cheering sight. The problem is one of the constant condition of the habitations of the poor, the meableness of whose dwellings is in great part due to ignorance of the simplest sanitary laws and principles. Information on these points has been to a certain extent defined
I B. Foreign I apparently quite opposed to the spirit of our Constitution. The spirit of our Constitution, if it is said to be, may not the time come, when the needful public power to inspect and compel the improvement of the houses, water, sewerage—perhaps the agricultural drainage—of every district, shall be as integral a member of English as he was of Roman civilization? The if such a day should ever come it would be an era prodigal in the history of our, for as long as the increasing demand for houses heads so close upon the heels of the increasing supply, that the landlords can obtain an exorbitant rent, let the state of the dwelling, be what they may what then again the very day they are uncrowded, they will not pay proper attention to the improvement of the houses, nor provide them with the commercial demands of life.
among them by the efforts of Health of Towns Associations, Sanitary Associations, and other channels, but nevertheless little real or practical information is retained by the people generally. To the aid of the poorer classes, private individual teaching in example must come. In some large towns there are numerous associations having for their end the welfare of the masses. Let the members of such, ministers, doctors, all medical men, impress upon the inhabitants of the miserable places of our towns, the grave importance of habits of cleanliness in person, bedding, and clothes. To the evil effects of impure air on the constitution, and numerous other details in the Science of the preservation of health.

As our towns increase in size great care must be taken that the streets are wide, well-paved, properly drained. That the houses be built with due regard to ventilation and fitted up with all necessary appliances. To thoroughly well drained, ventilated, and well-lighted. Even to the classes who inhabit the better portion of our towns, as well as to our poor, need practical hygienic information. They are not sufficiently alive to the importance of having their bed rooms large and well-ventilated, of discontinuing the use of curtains which prevent the admission of air to their sleeping rooms. Of the beds and properly ventilating both sitting and sleeping rooms. Every sleeping room should have a chimney. Beds should not be made on them, so that generally one soon after the people are out of them, fires should not be lighted in bedrooms before the hour of bed time. In short, every facility should be given to having sleeping rooms well aired in which one third of life is on an average spent.
But while the removal of all obstacles to the free impress of air be secured, care must be taken that the air be as pure as possible. For this purpose the numerous sources of its pollution must be swept away. Temples, manure-wards, within feminine establishments ought to be removed from the heart of cities. The close, filthy cloisters ought to be most carefully whitewashed, at public expense a proceeding which has been shown to be of great value in times of pestilence. Self-id, promenades ought to be for ever done away with - let us henceforth lead in strictest, simple, monastic lives. Even the dead may not be disturbed - not in the midst of the abode of living men, but in promenades situated at some distance from the town or city.

It is singular to notice what curious ideas prevail respecting personal cleanliness. Many confine their daily ablutions to their face, hands, neck, deeming the other parts of their body of little consequence. Many will carefully supply their beds with water for bathing in, but take opportunities for giving their dogs a plunge in ponds or the sea, yet they will allow the lather of their own backs to go for months in a clapped and mendicant state, highly opposed to its proper performance of its secondary functions. They look with a sort of dread upon the morning bath, a subject which foreigners take especial notice of. Dying at the scarcity of water the poor are obliged to go without clothing in an abominable state of filth which is very detrimental to health as well as decency.
Of no less importance to public health, is a plentiful supply of pure water. Apart from its high utility as the medium for the nutrition of animal as well as vegetable life, it is of essential value as a defoliant. No kind can be of course clean or dirty in proportion to the abundance or scarcity of water, as itch and disease are well known to be intimately connected. A city that is situated in its water supply, may be safely set down as an unhealthy one. Water is a necessity of man's living existence, and exercises powerful influences for good or evil—that being much truth in the old proverb that "cleanliness is next to godliness." Considering the immense utility of a free supply of pure water, whether viewing it as a benefactor, or according to its numerous economic uses, it is a stain upon our country that so little has been done to supply the people of our large towns with this necessity of healthful existence. The ancients, it is well known, far surpassed the moderns in their provision for water, as are afforded by their aqueducts, testify they bestowed great care and expense on the means of procuring it pure. It has been proved by evidence both medical and scientific that cannot be doubted, that epidemics of cholera especially, are very greatly aggravated by the defective quality and quantity of the water. As a consequence, the defective sewerage and those waters which are impregnated with decaying animal and vegetable matter as the third and fertile sources of disease. Indeed there is very reason to believe that fever has been directly originated in a locality from the drinking water of the inhabitants being...
contaminated with decaying substances, that the predisposition to attacks of malignant cholera is specially increased thereby. 4. That dysentery has been caused by drinking marsh water. It is said too that the use of hard water as a beverage increases dyspeptic complaints and makes epidemics more severe than before.

It is absolutely painful to read the evidence of such men as Mr. Bowie, Dr. Hector Gavin, and the condition of the water supplied to different districts in London. We may conclude that such a degree or less extent is the case in many many of our other cities large towns. I quote a few sentences from the evidence of Mr. Bowie. "In the city of London, the water is in general very low; sometimes altogether wanting; often thick, muddy, putrid, unfit for use." In many courts and alleys, no water is laid on: the inhabitants have to get it by begging or from the neighboring pumps. They have been without water for 3 years; often more indeed. It is rich in color, "water dipped with hand," very dirty. "The water is quite yellow; tastes as if un purified, often contains worms and rich green." These places which are so miserably deficient supplied with water are stated to be the chief seat of cholera.

That such a state of things should exist in the capital of England is certainly a foul blot upon our country's architecture. Surely our liberty cannot equal the powers of despotism in supplying the masses with water, which is unattainable by themselves. We know that Jerusalem and Rome were profusely supplied with water both from reservoirs and pipes. Aqueducts and reservoirs were constructed by
The Romans & Spaniards by the Peruvians learned in these warm countries: It is needless to mention the canals of Tuscany, Abyssinia, Mesopotamia, Egypt & other Eastern Countries, which are well known. Science & engineering skill in our boasted days of civilization ought to render a like service to our unwashed, poisoned, populations. The public purse & private philanthropy have done much for our criminals in the way of teaching jails, & but have missed much more important & necessary charities, of which the supplying water gratuitously to one poor is one of the most noble. In the South, Government ought to take into its own hands the work of "water supply" which experience has shown cannot be done by Water Companies etc. In the North here, the method of water supply which is gradually spreading this Scotland & part of the North of England, exceeds all others in the simplicity of its process & the purity of the water obtained. It consists in collecting, over certain elevated gathering grounds, the whole rain fall of the district, whether from natural springs or from the artificial drainage of the soil, & conducting them down to reservoirs of a sufficient height to supply water at a constant high pressure. Such water is of a degree of hardness varying from one to a half to five degrees & is of excellent quality. This process will no doubt in time spread this & Britain, & we have here now a plan may be put to some towns supplied by water of good quality, in abundance & cheap. It places where no facilities exist for carrying out this plan. The water obtained from wells be of good hardness owing to the various salt contained in it, they may be reduced to an average state of
hardness by Prof. Clark of Aberdeen's well-known process (only applicable to the bicarbonate of lime impurity) by filtration.

The question of the hardness or softness of water is of very considerable importance, especially to the poor. Of this Dr. Clark speaks strongly, remarking that owing to the additional expense in soap & to the extra wear & tear of clothing when the washing is done in hard water, habits of cleanliness are discouraged both as regards clothes & persons.

Other sanitary arrangements & regulations are comparatively useless without a good, easily obtainable supply of pure water. That, as far as possible, in purposes of cooking & drinking water it is absolutely necessary & therefore invaluable. Then improve it not only injures the health but drives people to combine it with spirits or to drink mead & liquors in its stead, & thus lays the foundation of habits which lead to intemperance. The movement which a lady in this city has so greatly contributed to, namely, that of erecting drinking fountains, is a step in the right direction. But in my opinion, if these were to be located in the more densely populated parts of our city, they would be of still greater usefulness, both in preventing drunkennes & in improving cleanliness. A second movement which is worthy of every encouragement is the construction of baths. The bath as an agent, in sanitary reform, for the preservation of health as well as for the cure of disease has been strangely neglected & overlooked in our country. Its great importance was, however, fully recognised by the Egyptians with whom bathing was a familiar practice & that, by both sexes. In Homeric times it was customary to take bath-tubs that
Both in Rome, public baths were open upon payment of a small fee. In Egypt, in olden days, the bath was a "great institution," and in our days, sign of its approaching that statistics are appearing. Nothing is more likely to prove a greater preventive against epidemic disease than paying attention to the state of the skin, which is the greatest medicine for purifying our bodies. In spite of much that has been said to the contrary, I am convinced that much of the melancholies in which the working classes, habitually, live, is due to defective means of purification and not to melancholy. This is shown by the eagerness with which Public Baths & Wash-houses are sought after in places where they have been constructed. The spread of these admirable institutions is really the desired, sought to meet the encouragement of every philanthropist man, & ought to be especially upheld by members of our profession. It is very cheering to know that in many of our large towns these institutions are now in prospect or already in action. In conclusion, I only add that the establishment of baths, or a national institution as suggested by Mr. A. Bain, that it ought to be spread among the foremost of the necessaries to support of life; that a place should be found for the baths among the regular occupations of life.

Intimately connected with greatly dependent upon, the water supply is the subject of drainage— one of the most important means of the prevention of epidemics. The ends of drainage are, to carry off the superfluous moisture of the soil & to impede the formation of stagnated fluids, which more or less result, when many the domestic animals are congregated. The salubrity of a District is
both in Rome public baths were open upon payment of a small fee. In that in olden days the bath was a fit end in which human beings were seen. In our days signs of it approaching are becoming more frequent. Nothing is more likely to prove a greater preservative against epidemic disease than paying attention to the state of the skin which is the greatest medium for purifying our bodies. In spite of much that has been said to the contrary, I am convinced that much of the melancholy in which the working classes, habitually diseased, is due to defective means of purification;

not to richness. This is shown by the eagerness with which public baths are sought after in places where they have been constructed. The spread of these admirable institutions is really the desired, sought to meet the encouragement of every philanthropic man. I ought to especially be thankful to members of our profession, it is very cheering to know that in many of our large towns these institutions are now in progress or already in action. In conclusion, I only add that the establishment of baths as a national institution as suggested by Mr. A. Brain, that it ought to be ranked among the foremost of the necessary supports of life, that a place should be found for the baths among the regular occupations of life.

Intimately connected with greatly dependent upon, the water supply is the subject of drainage—me of the most important means in the prevention of epidemics. The evils of drainage are to carry off the surplus moisture of the soil to the inferior deteriorated fluids, which more or less result when man and domestic animals are aggregated. The salubrity of a district is
Close connected with its natural drainage—in moist, marshy
districts disease is apt to prevail. The disappearance of spa-
from many English counties where it formerly prevailed is owing
to increased drainage in those parts. The drainage of homes is col-
lected in houses, while there must be daily removed the solid
fluid reaching of man's senses is one of the most important facts
connected with the preservation of health. Both in town and
the necessity has not been sufficiently provided for. Slade, in
his book in reference to his excavations of the
remains of that ancient city, he found the building of an age
estimated at 1200 years B.C. provided with a complete system
of sewerage. Each room he says had a drain connected with a main
d sewer. It has been supposed that drainage in early necessary in the county
than in the town; but the instances recorded by Dr. Chisholm, of fever
occurring in various a farm house, in Peeblesshire, where inspection
discovered that the house was completely surrounded by drains
which had in the course of time become filled up with the drainage
of the farm yard, necessary to, seem to dispense the idea.
It may be very confidently stated that every invasion of fever
is going this a house or collection of houses may be traced to deficient
drainage, general sanitary neglect. Bad drainage besides,
tends to the contamination of wells, and many of the worst epidemics of
fever and cholera have been traced to this disgusting source.
The cause of epidemics in some of our cities has been traced along
the course of drains, which had become choked up from
Mr. Bullow examined by the Health of Towns Commission gave it as his opinion that public health is more detrimentally influenced by exhalations which arise from pent-up matter in the private drains or the sewers of individual tenements than by those which arise from the great main or common sewers; that the reason why they act so insipidly that they get wholly choked up, is simply because there is a limited supply of water to spread over so great a surface that its power to carry along matter in suspension is lost. The choked pipes never occur if the caliber of the tube or drains intended to carry off of the soil were not made so great that the usual allowance of water is unequal to the task of washing out its interior.
want of water is the cause in consequence had prior rise to the
production of chronic sickness which had no doubt been
the effective agent in the diffusion of the disease. Mr. Grainger
in his pamphlet published by the "Health of Towns" Association
remarked, "The most prolific source of disease in towns is certainly, defective
drainage systemage." Let us then our systems then properly constructed
for their efficiency depend on the ability of real effective house drainage.
It has been satisfactorily proved that most of the old sewers and drains
are defective from permitting the deposition of solid matter in their
interior from the improper size, defective slope from the sharpness
of their angles, or curves at the points where the smaller systems
enter the main trunk. The drains should not be placed too near
the surface lest the underground premises be undermined. The hard
interceptors for their drainage when they get out of order.
The proper construction of public should also be looked to so that
they be not full of holes or crevices which foster decaying fests. In
addition to their scientific construction it is of the very greatest importance
that they should be periodically thoroughly "flushed" by a full supply
of water in a full steam or man impulsively through passages.

Another prophylactic agent is a free supply of light. The free
power of light as an excitation of animal vegetable life has only
lately been sufficiently recognized but as every day learning more so.
While auspiciously speaking is known of the effect of the absence
or diminution of the stimulus of light on animal development.

Health but it is being more attended to as consequence of the rapid

Very Movement
Dr. Edwards has observed that people who live in close, isolated, and unexposed places are apt to produce deformed children. It has been stated in good authority that the cases of deformity and the dark side of an extensive barracks in St. Petersburg have been uniformly for many years in the proportion of 3 to 1 to those on the face exposed to strong light. It is now there fore a received fact that a free supply of light is almost as necessary to health as fresh air, pure water; for it is believed that light has an important chemical action on organic matter. Heathen down decomposing effluvia of various kinds, in a manner, however, not yet understood. This is proved by the fact of dark water-stacks being much much more ill-odored, however clean kept, than those to which the sun's light has free access.

Another great prophylactic agent is a sufficient supply of wholesome food. So one needs to be told that a thing is. The daily food is soon shown by a pulling of thinness. Effort must always be made to get the cravings of hunger appeased. This result may be attained without adding sufficient nourishment to the body. Chemists and Physiologists, together are able to state the quantity, quality, and food necessary for the maintenance of the supply of the body against its continual waste. So the perfect nourishment, but numbers are unable to profit by the scientific discovery. This is owing to the vicious practice of low tradesmen selling deteriorated and false substances.
in the more destitute localities of our large cities, such as bake house, stable, &c., &c., &c., a numerous host of adultrated scally
A daily consumption. In connection with this subject there is part
receptivity for a vigilant Inspector of Food. Then from utter poverty
many indeed lack the necessary nutritive elements. In all large com-
munities there must always be numbers out of employment, com-
scribed to live as best they may, as a consequence become weak & diseased. It was observed that during a season of commercial
defision in the West of Scotland in 1836, Fever & Influenza
prevailed much more extensively, with more marked fatality
than usual. Efforts were made in the way of improving the
destitution, & synchronous with the better feeding of the unemployed
thus ensued a marked improvement in their state of health.
Another notable period of commercial depression—1842-3—
was also a remarkable period in epidemic disease, which was
principally confined to the unemployed. It is speaking with due
consideration on the adoption of measures of relief. The district
surgeons in Glasgow bore testimony to the fact that the greatest
amount of disease occurred among those out of employment.
In 1838 cases of Fever in Edinburgh inquired into by D'Albert
some years ago, about 700 were found to have had little or no work.
Connected so closely, then, as epidemic diseases are, with deficient
feeding, we need hardly say, how important, needful & chrisian it is
that during years or decades of "commercial depression", numerous
well organized "soup-kitchens," to other means of relief, should be opened.
in all large towns, so that the unemployed & the very poor should be supplied with the food they so much require.

Another great requisite, especially in this country, in the way of maintaining the tone of the system, & thus enabling it the better to withstand the attacks of epidemic disease, is a sufficient amount of good clothing. Our climate from its very variable character, is especially calculated to lay the foundation of serious disorders if not properly provided against. Dr. Erxleben observed that two thirds of the diseases occurring amongst the children of the poor were due to exposure to cold.

Dr. Milne Edwards observes that "the greatest proportion of deaths among children in Paris is due to exposure to cold." Norman aware of the great importance to health of good clothing said, "Let an infant have plenty of sleep, milk & flannel!" It has been estimated that one third of the deaths of young children result from cold.

There exists a very wide spread, but very beneficial, idea among all classes, that children may be rendered "hardy" by exposing them unnecessarily to cold, by clothing them inefficiently. The high rate of infantile mortality is no doubt partly owing to this fallacious idea. Various disorders being a concomitant, or preliminary stage, of many epidemic diseases, as this is one of the most frequent results of cold applied to the surface of the body, it was in no doubt a predisposing cause of epidemics in this way, as well as in others. The importance of clothing societies, then, as a preservation of epidemics can scarcely be overestimated.
Another prophylactic of great value is the careful management of the young. It is not far from the truth to say that a man will be strong or weak, wise or foolish, according as he has been well or ill nursed during infancy. The absence of maternal care is highly detrimental to the young; it is abundantly manifested in Foundling Hospitals. In one such institution in Moscow, 75 per cent of the children died annually. In London about a century ago, the workhouses exhibited the appalling record of 23 deaths in every 100 children, under 1 year, but when proper attention was paid to them, the mortality was reduced from 2,000 to 450 per annum. In large towns where mothers employed such an extent in feeding, children fell readily prey to disease; to those who survive this all the ill-effects, neglect & want of suitable nourishment which fell to them only many pox, a shrunken, emaciated form; they are peculiarly liable to be cut off by epidemic disease. But mothers & guardians of the young are now chargeable with more than mere negligence—they often inflict positive injury on their own offspring. Some of amusement or pleasure of various kinds, if then children are likely to prove obstacles to their employment, they resort to "quick'ry powder," or opium, to produce sleep. Such a proceeding is very general among certain classes of the community and is hardly, say, criminal. By the above means disease is produced in all large communities, a numerous class of infected persons who populates these subjective elements in their constitution which are so well suited for the active operation of epidemic poisons. Facts upon the careful training of the young ought to be distributed among the classes to which we alluded & above.
In the category of prophylactics must be included temperance, moderation in eating and drinking, control of intemperance or their tendency; but the latter has ever been one of the most efficient handmaids of disease. It is not alone by the amount of direct physical debasement which is induced that we must estimate the evils of an abuse of alcoholic fluids; there are also such collateral evils, as, purity of personal habits and the want of a comfortable home. If intemperance is a curse not only to the man or woman who is the subject of it, but before his or her family. It prevents a great barrier to the efforts of the philanthropist or social reformer.

Much diversity of opinion prevails regarding the most suitable mode of putting down or abolishing drunkenness. As restrictive measures do not seem adequate to stem the tide of debauchery, there is no hope if a Manic begins home in our country, the chief reliance must be placed upon measures that aim at elevating the people. Improving their rational and enjoyment, occupation. In proportion as the sanitary condition of the men's homes is improved, will their craving for artificial stimulants be found to be done away with. For the chief reason of the drunkard numbers, benevolent schemes are at present at work, each taking a great deal of good. With drunkenness but abolished, we should not only have less disease in general but of epidemic disease in particular. The one intemperate man, from his depravity, enfeebled upon him, by sober habits, would not only entertain a greater respect for himself and family but would also aim at propriety, decency of life. He would be able to buy those
necessary to life which his family had not formerly enjoyed and which are so essential to the preservation of health.

In the second place, the prevention of epidemics is best forwarded by subjecting individuals to a mild form of the disease. This can of course refer only to the case of smallpox. Of late years there can be no doubt that epidemics of this disease have been becoming both more frequent and more violent. So late as 1853 it appeared as an epidemic in several localities in Scotland where many victims unprotected by vaccination, that in the town of Dundee alone, the death from that disease during the year constituted no less than 9.3 per cent of the mortality; while in some other places nearly a third of the deaths were caused by it. During the first quarter of 1859, a violent epidemic of smallpox appeared rapidly, carrying off numerous victims. It is well that the people should be aware that they have in their own hands the means of not immediately meeting, at least of so mitigating the disease, that, almost, nay it danger to life, to the destruction of sight in the disfigurement of the countenance, are taken away. We have no reason for maintaining any such Utopian doctrine as that even the vaccination of the whole population would prevent smallpox occasionally appearing as an epidemic. But this, we do know, that vaccination properly performed, can modify the disease, that it may be said to deprive it of all its dangers not only rendering a fatal effect comparatively rare but preventing those evils which the unmodified disease produces. In consequence, how much of the apathy or ignorance of many of the lower classes, he best
epidemic I since have found numerous victims everywhere quite unforeseen by vaccination. The spread of the disease amongst these in its most virulent forms kept up the in certain localities, caused them to act like new centers of contagion long after the disease would otherwise have passed away. This is one of the evils of having always a large number of unvaccinated persons among us; we are counting a plague which after its break out among the unprotected, increases its contagious virulence, till it attack, are susceptible of receiving it. Every facility ought to be given to the poor, for setting their children vaccinated, by dividing towns and districts where in certain days and certain hours, properly qualified persons would attend for the purpose.

Again, among the various preventive measures we must place Ventilation and Disinfection which act by preventing transmission of the poison.

Of the importance of free ventilation of houses inhabited by people in health, I have already spoken, but the receptivity for it in the sick chamber cannot be too much insisted upon. By allowing abundance of pure air to obtain entrance into rooms or wards, the fumes exhalation from the persons and excreta of the sick are so diluted as to be almost entirely harmless. The condition of the atmosphere breathed by the patient, seemed in the epidemic of cholera of 1832 of more, to determine its contagious property. Where the patients were much separated from each other that plenty of pure air about them, the disease was believed by many not to be contagious. But where they were crowded together as in hospitals or in close ill-ventilated rooms, the fumes of the patients, & their excreta, appeared to have infected
The atmosphere properties which rendered it capable of communicating the disease. The air seems one of the best, if not the best, disinfectants, each by diluting the poison & carrying them off when they have been reduced to harmlessness. This, however, & other disinfectants cannot be obtained in numerous other instances, disinfectants ought to be employed. There & Playfair have been classed under the three heads of true disinfectants, decay preventers & deodorizers. Of these disinfectants, the places most reliance upon Chlorine which act, very efficiently in destroying most decayed emanations which, if they do not cause disease at least from its progress. The good results of its use were well shown in Edinburgh during various visits which passed there. Small rooms were washed with whitewash to which a little Chloride of Lime was added, the houses were fumigated as well, with the very best effects. Chlorine may be used very simply by private individuals, by spreading out a quantity of Chloride of Lime on plates placed in the different passages of the house. Such a proceeding by giving greater assurance to the timid, acts as a preventive for fear & one of the most powerful predisposing causes of epidemics. If the decay preventer & deodorizes it is unnecessary depend as the diseases that Chlorine & white-wash perfectly sufficient to act disinfecting each.

A further means of prevention is the separation of the sick from the healthy. The separation of the sick is effected by Quarantine establishments, to the cabin of which it is believed that one once our happy immunity from attacks of plague which has not visited Britain since the plague of London, in 1664-65. At that time our Quarantine laws began their enforced till now with the happiest results.
Some of the regulations may be said to err on the side of excess of caution but that is preferable to rash experiments. The period of 40 days might easily be admitted however.

Fomites are generally clothing & stuff furniture which have been about or near the bodies of patients suspected to be infected with the poison in a very concentrated condition as well as capable of retaining it for a long time & of transporting it from place to place. These substances should be freed from the poison by long-continued exposure to the air, by washing with boiling water, by exposure to the fumes of chlorine in a closed room. The room or cabin ought afterwards to be fumigated & thoroughly cleansed. Articles which cannot be washed ought to be exposed to long heat (212 Fahrenheit) which has been proved harmless & capable of destroying the contagious property of fomites.

In the next place we must among the means of prevention proper treatment of the sick so as to prevent the production of the materia morbi. Hence it is possible a large sick room ought to be made the sick chamber, containing no superfluous furniture properly ventilated & if considered necessary disinfected by chlorine. The crowded rooms of the poor are bad enough in health but are much worse in sickness. Hospitals ought therefore to be opened for the admission of the poor where they may be properly treated & thus prevent the spreading of the disease be prevented. This in its next consequence in the country where hospitals do not exist. A suitable house in country districts ought to be erected in the village, properly laid out & furnished, so as to prevent the disease from diffusing itself. The expense would be very trifling-
Other means of prevention may be mentioned, such as,
the avoidance of infected currents of air, infected water,
the prevention of the evolution of the matter, mainly by
disinfection of the sick,
mostly by antidotes such as quinine, opium, alcohol,
vegetable acids, proper regulation of the diet & hopefulness
which is certainly of vast importance as has been found
in numerous instances.

In conformity with my intention, I have entered very largely
in the consideration of the preventive measures that ought
to be employed against epidemics. Most space has occupied
my being so brief on the others, but that is of no moment as in
my opinion the former are mainly to be relied on. The prevention
of epidemics is, I believe, in the hands of the people. They can if they
will but supplement public works & drainage by attention to private
works in their own houses, greatly diminish if not entirely exterminate
epidemic diseases.

In conclusion, keeping in mind what Jenner has done for
mankind in regard to smallpox, may we not indulge the hope
that some patient, earnest worker in this field, content like him to
"seem delights while laborious days," shall yet put up in the profession
of the means, if not of immediately aneomising, at least of so modifying
other epidemic diseases, that almost all their danger to life will be
taken away? nor that Chemistry with all her approved modern appli-
cances may not detect their subtle & mysterious exciting causes?