BIRD (G.G.)

OBSERVATIONS

ON

CHOLERA,

TOGETHER WITH

REFERENCES AND QUOTATIONS

FROM SEVERAL OF

THE BEST AUTHORITIES OF THE TIME,

CALCULATED FOR

THE PERUSAL OF THE GENERAL READER.

BY

GEORGE GWYNNE BIRD, M.D.,

PHYSICIAN TO THE SWANSEA INFIRMARY.

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SALUS POPULI SUPREMA LEX.

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1849.

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ON THE SUBJECT OF

CHOLERA,

ADAPTED FOR THE GENERAL READER.

BY GEORGE G. BIRD, M. D.,

PHYSICIAN TO THE SWANSEA INFIRMARY.

SALUS POPULI SUPREMA LEX.

"There is an old term, as old as the good old English Physician Sydenham—'Constitution of the Atmosphere;' and to what else than to some inscrutable condition of the element in which we live, and breathe, and have our being—in fact, to an atmospheric poison beyond our ken—can we ascribe the terrific gambols of such a destroyer."—Dr. FERGUSSON.

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1849.

RESPECTFULLY DEDICATED

TO

MICHAEL JOHN MICHAEL, ESQ.,

Mayor of Swansea,

AS A TRIFLING TOKEN OF THE GRATITUDE AND ADMIRATION FELT BY THE AUTHOR,

IN COMMON WITH

THE INHABITANTS OF SWANSEA AND ITS NEIGHBOURHOOD,

ON ACCOUNT OF THE

PATRIOTIC ZEAL, MANLY DETERMINATION, THE PROMPT BENEVOLENCE, AND THE UNWEARIED PERSONAL EXERTIONS,

OF

THE MAYOR,

IN

INSTITUTING AND CARRYING OUT SANATORY MEASURES, AND PROMOTING AND PROTECTING THE PUBLIC HEALTH,

IN THE COMMUNITY OVER WHICH HE PRESIDES.

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"No man can be a useful member of society, except so far as his talents are employed in a manner conducive to the general advantage."—GODWIN.

Swansea, Aug. 13, 1849.

generally entertained, or that such comparative individual safety and doubtful immunity should be sought, excepting in cases of absolute necessity, because it would evidently seem best that in a case of common danger, all alike should face their common enemy, and make common cause to check and effectually resist the evil threatened. It is evidently as right and proper to do this when a disease arising out of natural causes generally prevails, and by which the public health is threatened, as it would be in any other case where discreet and effectual combined resistance may be legitimately exercised for the general good with probable success.

Nothing that can be said carries with it more the aspect of truth than the old adage, which declares, the "weakest go to the wall;" yet, on the other hand, it is equally and most comfortably true, that in contemplating personal health and protection against the ravages of disease, there is another proverb which the experience of mankind has fully verified, namely, that "Glass will last as long as iron, if you take care of it." I think this last very significantly and truly applies to the present epidemic.

I have not yet personally witnessed any instance (and I have seen many) of Cholera that could not be accounted for fairly and rationally, as arising out of some one or more of the known causes which were likely to have given rise to its appearance; and as by far the majority of such ascertained causes are of a nature which admit either of removal or important amelioration, it is right they should not only be known, but duly considered and carefully obviated.

This becomes the more urgent, in as much as these causes to a great extent are of a character which are likely to affect the many rather than individuals, and therefore it is highly probable that in such instances, on the appearance of Cho-

lera from such causes, *those who are similarly situated will be likely to be similarly affected,* unless *all* combine promptly and effectually to perform the highly important duty of seeking for and removing *all* probable causes, which favour the developement of disease; and, unfortunately, many of these are of such a diffusive or spreading nature, that *no one can offend against sanatory laws without the greatest danger of injuring his neighbour quite as much as he does himself.*

I think the necessity for a well connected and combined plan of sanatory operations, having the object of protecting the public health in towns and other communities will be sufficiently apparent to every rational mind, because epidemics generally (the one present being no exception to the general rule) for the most part select as the scene of action places where the damaging forces that militate against health most prevail; consequently, the localities selected by Cholera are especially those where filth, bad ventilation, and other fostering causes of pestilence are present, so that there can be no security for such vicinities, however careful the neighbouring residents may be in their own individual conduct in sanatory particulars. A recent medical writer has well expressed the above sentiment in the following words:—"During the prevalence of a pestilence, no domestic habitation is safe merely by reason of cleanliness and strict sanatory arrangements observed by the inhabitants; for if the same care be taken in a whole row of houses, save and except in one near which *filthy accumulations, undrained cesspools, or putrid matter of any kind, or stagnant water,* shall be allowed to accumulate, it is obvious that the wind so setting in as to waft the effluvia into the adjoining habitations or premises, may reach the inhabitants of any buildings in the entire row." *

* Dr. Collier's Code of Safety, page 35.

It will be seen, I think, that Cholera in these climates for the most part riots amidst scenes of filth, fear, intemperance, over crowding, bad diet, and bad ventilation, and is no less deadly in its influence where it finds the twice afflicted victims of want and grief, viz., amongst such of the poor of the community as are exhausted by all the hardships of penury, immediate fatigue, and depression of mind. The latter causes well bespeak the kind consideration and elemosynary aid of the charitable, compassionate, and wealthy, not only on account of the immediate objects of their bounty, but also on account of the public safety, for one of the most sure ways of checking the general spread of a pestilence is to remove as many probable victims as possible from its deadly influence; and thus charity judiciously and effectually bestowed, and intelligent advice duly followed, are as effective often in arresting the progress of some epidemics, by improving the condition of the people, as vaccination has proved successful in defying and almost annihilating the ravages of small pox, by fortifying the constitution against its attacks. I do not wish to be understood as by any means asserting, that in all cases Cholera selects its victims from the purlieus of wretchedness and dirt, for it is quite otherwise in many instances; yet, for the most part in this climate, such has hitherto been the case.

True it is, the palace may be visited as severely as the peasant's hut, and this is not very extraordinary, and it is even so with some other occasionally prevailing diseases; for instance, typhus fever may make and has made similar visitations, so did the sweating sickness, another epidemic, and so with several others. This I do however mean to assert, viz., that, as a general rule, the more cleanly the cottage and its vicinities, the more safe is it for the mansion and its adjacencies; and the less (particularly in contagious diseases) there is of

such sickness amongst the most numerous class, "the poor," the less are they likely or competent to carry it and spread it, by means of their clothes and personal vicinity or contact, amongst the population and persons whom they approach.

How such things may happen may be readily gathered from the well known fact, that washerwomen are very liable to take contagious diseases; and as regards clothes, I myself remember an instance when a gentleman sent a coat to a village tailor to be repaired; in this tradesman's house there was small pox, but he had not the candour to state the fact, and the coat was returned and worn by the owner, who immediately sickened with the disease and died. Again, as regards some contagious diseases, and how readily they may be spread, I may instance the fact, that in the dire disease called puerperal fever, if a medical person or nurse happens to attend a patient so situated, they are apt, take what ever pains they may, to communicate the same for some time to lying-in patients whom they may subsequently attend. A little serious reflection on such facts would lead to wise determinations and actions, and proper proceedings in many epidemics.

As to the malarious influences in spreading diseases, I will present to the reader, before I close these general observations, the following extract from the author just quoted, namely, Dr. Collier, to shew with what CURIOUS PRECISION such emanations may affect individuals:—"On the 11th of May, 1750, at the Old Bailey, the prisoners were kept nearly a whole day in small, ill ventilated, and crowded apartments, some of them then labouring under the jail fever. When they were brought into court, the windows at the end of the hall, opposite to the place where the judges sat, were thrown open. The people on the left of the court, on whom the wind blew, were infected with malignant fever, while those

on the opposite side escaped. The Lord Chief Justice and the Recorder, who sat on the Lord Mayor's right hand, escaped, while the Lord Mayor and the rest of the bench, who sat on his left, were seized with the distemper. Many of the Middlesex jury, on the left side of the court, died of it, while the London jury, who sat opposite to them, received no injury." *

In the following few pages I shall frequently illustrate my assertions and statements by similar quotations, because I believe such a mode best, in as much as truth, when conveyed in the words and with the prestige of men of well ascertained wisdom and indisputably great reputation, carries, I think, with it greater weight, and naturally impresses the mind more effectually with conviction, than it does when it emanates, unsupported by such evidence, from persons of ordinary capacity and humble attainments.

I shall now proceed to give a brief general outline of the history, nature, and causes of Cholera, together with some short observations as to its prevention and general treatment.

As to the history of Cholera.—The question that would probably first occupy the interest of the general reader would be, whether or not this disease had occupied the attention of the ancients; and in this respect I may briefly observe, the subject has given rise to discussion and difference of opinion, for the evidence on this point is by no means entirely free from doubt.

A correct knowledge of the facts of ancient history can only be derived from the records of such times, and the testimony procurable from such source as regards the disease in question is obscure, much being left open to inference or conjecture, neither of which can enable us to arrive at clear and unquestionable certainty. I am inclined to think it has

* Op. Cit., par. 69, fol. 35.

been observed at earlier periods than the present. Two circumstances especially may have contributed to the uncertainty alluded to; the first is, the comparatively unfrequent commercial and general intercourse which took place between the inhabitants of different parts of the world, in earlier times, so that what occurred in various places was not likely to be so generally well known, or accurately recorded as in our own days, when communication is frequent and scientific enquiry ever active: the other cause alluded to is, that although the same complaint *may* have existed in the earlier ages, the precise form in which it then appeared, and many of the phenomena displayed, may have assumed an altered character, as contrasted with our times, so as on comparison, at this distant period, not to be so clearly and distinctly recognized. It is hardly to be wondered at that such uncertainty should exist with regard to the more early times with reference to this subject, when much doubt has been expressed even as to whether Asiatic Cholera really ever existed in our own country at any period of its earlier history.

Sydenham has described such a disease, and it is by many believed and affirmed from the evidence, that the complaint he wrote on was identical in its general character with the epidemic which has so devastated the world in the present age. Yet many writers, and some of them of high professional reputation, and unquestionably great bibliothecal pretensions and learning, have questioned the correctness of this conclusion. I may mention that the late Dr. M. Good, Dr. Copeland, and others, have done so. In so far as my humble judgment can guide me, looking at Sydenham's own words, and regarding the way in which the evidence has been set forth by several writers, particularly by the late Dr. James Johnson,* I think it was the same disease.

* Diseases of Tropical Climates.

I may also add, that Dr. Billing * and others support this view of the question.

It has been clearly proved, and is I believe universally admitted, that the first visitation of the present epidemic Cholera in our times occurred in the year 1817 in the East Indies, in the presidency of Calcutta, whence it has spread nearly over the whole earth's habitable surface at different periods. I may here observe, that a question has arisen, and has been much discussed, as to whether this identical disease had ever appeared before in India. I will also unhesitatingly express my own opinion that it had done so. Dr. George Budd's † able paper on Cholera has, so far as I can arrive at a conclusion, in addition to other testimony, fairly set this point on its indisputably correct basis.

I think the *history* of Cholera, like that of other epidemics, of interest and vital importance, *equally* so in some respects with *its actual treatment*, at a time when the disease is present; because, if it be true that a given epidemic has appeared from time to time, the same in its general characters, but protean and varying in some of its symptoms and morbid phenomena, it follows that the treatment to be adopted, like the history, *must necessarily vary*, if success be the object.

Of this we are very sure, that even within a short distance of geographical space, the type, intensity, and mortality of epidemics will vary in an extraordinary degree, so that whilst at a given time and locality the same disease will be deadly, and medical treatment very unsatisfactory, at the same time in another place, at no great distance off, it will be quite otherwise. This is one mode of accounting for the many specifics which are so absurdly and shamelessly vaunted as being *curative of Cholera*. For the disease itself can

* Principles of Medicine, p. 248, pub. 1849.

† Library of Medicine, vol. 4, p. 101.

obviously only be properly dealt with by being correctly studied and adequately administered to by those who, so far as human knowledge and information extend, are competent to do this; for even individual cases, as must be readily acknowledged by anticipation on the part of rational and educated persons, will, in the same place and at the same time, vary much in many important particulars, and require considerably modified treatment.

It will be foreign to the present object that I should minutely capitulate the geographical progress of Cholera, in its visiting and revisiting various parts of the globe, since the year 1817, its first appearance. The details would be tedious, and such accounts are seldom perused by the general reader. I may add, however, that those who desire to be informed on this subject will find, amongst many other accounts treating of the history of Cholera, much masterly information and sound argument in the respective able writings of Dr. J. Johnson,* and by Dr. Annesley,† Dr. Greaves,‡ Dr. G. Budd,§ Dr. Copeland,‖ &c. I would also refer to an admirable paper on this subject which appeared in the "Lancet," so far as my recollection at present serves me, either in the year 1832 or 1833; and as relating to the history of epidemics generally, I would refer to Hecker's History of the Epidemics of the Middle Ages, one of the volumes published by the Sydenham Society, a book replete with interesting information.

It will be sufficient here shortly to remark, that Cholera first appeared in India at Jessore, in the Sunderbunds of Bengal, about 100 miles from Calcutta, in August, 1817. During that and the succeding year it ravaged the penin-

* Op. Cit. † Sir J. Annesley on the Diseases of India.
‡ Dr. Greaves' Clinical Medicine. § Library of Medicine.
‖ Dr. Copeland's Medical Dictionary.

sula of India; in 1823 it reached the borders of the Caspian Sea, and in the year 1830 it appeared in a malignant form in the south-eastern provinces of the Russian empire, and reached Moscow in the month of September; in June, 1831, it was present at Petersburg; in September it reached Berlin; in October it appeared in Sunderland; and in February, 1832, this disease broke out in London.

In the present year we have a repetition of the pestilence, which does not appear by any means to have diminished in its severity. This has been equally the case with several other epidemics, which, when they have visited mankind, have over and over again returned with no lessened virulence; indeed, the repetitions of the influenza have often been far more widely spreading and fatal than at first,—a highly important fact, which, as it seems to me, plainly shews *the interests of all classes to be closely connected and vitally identified*, in the important duty of making common cause against those circumstances which are ascertained to favour the inroads of epidemics, and calculated to promote their extension, and should therefore urge all to use every effectual and useful means that human power can command to protect the people from such influences.

The following extract will show this importance, and significantly points out some curious and ascertained tendencies in the history of certain epidemics:—"The average visitations of new fatal exotics have been calculated as recurring at each revolution of forty years, and there is none on record which has been in this country less fatal than Asiatic Cholera. After the first appearance of an exotic epidemic, failing of naturalization, it has a tendency to repeat its visit once in each revolution of sixteen years. Thus the sweating sickness, which was said to have been brought over along with the army of Richmond, afterwards Henry VII., first appeared at

Milford Haven in the year 1483, when, meeting with no apt epidemical condition, it soon disappeared. It repeated its visitation under epidemic influence in 1485; and it reappeared altogether five times, with an average interspace of sixteen years; not until its fourth visitation reaching the court, and proving mortal to many of the courtiers in six hours, Henry VIII. owing his emergence from a severe attack to the well known vigour of his constitution. At its fifth and last return, or sixth visit, in 1551 it carried off 120 in a day, within the precincts of Westminster alone, where the two sons of Charles Brandon, both Dukes of Suffolk, died of it. $1551-1485=66\div4=16\frac{1}{2}$, which agrees with the interspace between the two visits of Asiatic Cholera."*

I think that these facts are worthy of the deepest consideration, and that they carry with them to all who have any power to do good *a solemn call to duty*,—a declaration that the zealous performance thereof cannot be neglected with impunity.†

A similar but striking appeal of the same nature has been pointedly manifested in our own times, and which another quotation from the same intelligent and faithful author fully sets forth; he adds—"In the capricious visits of an exotic, as in sweating sickness, the earlier visitations may prove

* Collier's Code of Safety, par. 116, page 57.

† "In all new epidemics, from the black death downwards, traced from the reign of Edward III., and in the more extended space of ancient history, derived from the Grecian, Roman, and Arabian authorities, as well as from Chinese and Brahminical tradition, we learn, that such new forces first commit their ravages on the lowest classes of society; but as contagious force gains ground so as to reach the upper classes, these suffer the greatest mortality, in proportion to the number of cases supplied by, and occurring in, such classes. This may not be manifested in a first visitation, but has always been verified in the sequel."—*Collier, Op. Cit.*, p. 52.

fatal to the poor; in the later the poor shall escape altogether, and the highest classes shall be the victims. Thus in the three first visits of the sweating sickness the rich escaped; in the fourth, they began to suffer; in the fifth, severely; and in the sixth, extensively and exclusively, the poor escaping universally. So in our own times, this capricious character is still preserved. The Irish typhus,* a new epidemic which appeared first in 1816, was for many years limited to the poor; but in the progress of its unhappy naturalization, it has found its way to the upper classes, and when contagiously introduced among their families, it is growing proportionally more fatal to them than to the poor themselves." The author adds in a note,—"The mortality (according to the government report) has been much greater among the higher ranks of society, whom the disease attacked, than in the labouring classes; and the physicians and other attendants, as well as the clergy, have felt its destructive force in much more than an ordinary proportion."

I shall here make no comment on the text thus derived from Dr. Collier further than to observe, that his sound and well written little publication is one of the most interesting I ever read, and, in my opinion, well worthy of the *careful* perusal and *attentive* consideration of the intelligent of the British public, particularly those who really have the general good at heart in sanatory measures.

In the "history" of disseminative diseases, nothing seems to me more curious and remarkable than their appearances from time to time, and the differences in character and effects;

* I may as well here as elsewhere advert to a curious instance observed in a chemical manufactory as relating to "*chlorine*," in connection with this fever in Ireland. Dr. Christison observes, "It is an interesting fact, that during the epidemic fever which raged over Ireland from 1816 to 1819, the people at the manufactory at Belfast were exempt from it." —*Christison on Poisons*, edit. 1836, p. 737, subject Chlorine.

for the same diseases present at different visitations different features, that is, they often materially alter in type and intensity. It is also remarkable how some of them have been controlled by human discoveries, and appropriate antagonistic agents.

As a matter of historical illustration, I may briefly remark, that small pox and measles first shewed themselves in the sixth century, scarlet fever early in the seventeenth century, and vaccination was introduced in the eighteenth century; syphilis became first known about the year 1494, and that the present malignant Cholera first appeared in 1817.

It is sufficiently obvious to every one, that, Providentially, some of the diseases enumerated have been brought in a great measure under control by human efforts, and that the treatment of all of them is better understood than formerly. This is encouraging; for whilst, on the one hand, we see formidable diseases appearing occasionally, so we perceive there are remedies to be discovered for averting or remedying such evils.

It would appear that it is ordained as necessary in the Divine government of the universe, that such visitors should appear from time to time among men for wise and good purposes; amongst these probably it is ordained that the family of mankind should, through such practical warnings from time to time, be compelled to learn the value of health by reason of sad reverses, and induced to use carefully the means of preserving this valuable blessing, so that the race should not be permanently deteriorated by their own indifference, carelessness, and neglect.

One further remarkable fact in the history of epidemics is, that they seem to convert the ordinary causes of diseases, and even the diseases themselves occurring during the visit of the epidemic, into something foreign to their general form,

and impart to such causes and diseases a new character,—in other words, such diseases become either the epidemic which prevails, or like it. Thus, when Cholera prevails, those causes which would usually produce ordinary continued fever or typhus, such as dirt, filth, bad ventilation, &c., all which we well know frequently occasion these complaints, are, when acted on by the Choleraic epidemic influence, apt to induce, not typhus or other continued fever, but Cholera or diarrhœa; and similar laws apply to many other epidemics.*

Again, during the operation of epidemic influence, diseases present will often cease to carry out the usual phenomena observed in their progress, and in lieu thereof will assume the character of the epidemic prevailing. Taking Cholera, again, for an instance, a patient may have fever or inflammation of any organ, a common cold, or even an injury;

* The atmosphere of organic matter thrown off insensibly by every population, more or less dense, as a district may be more or less open or close, and rendered more poisonous by the exhalations from common sewers, church-yards, vaults, slaughter houses, cesspools, factories, all commingling therein, may be sufficient to impress distinctive force in the living, so as to receive and impart the processes of reaction in the zymotic principles necessary to the spread of typhus fever; *but it is insufficient to develope epidemical disease, unless aided by that epidemic influence,* to which all progressive epidemics have been traced."—*Collier, Op. Cit.*, p. 53.

The same author also observes—"A new and extraordinary epidemic force brings all things under it, and sways the character of all acute diseases, so long as such force prevails. Thus a woman dying in childbed may have presented some traces of Cholera—a man stabbed may die with symptoms of Cholera—some may die of prevailing inflammations, yet shewing signs of Cholera—a case of poisoning may receive the impress of Cholera. Even the intelligent of the public, ignorant of this law, are apt to deride us for calling every thing Cholera, when we have merely described this last link of a chain, this crowning impress of epidemic force."—*Collier, Op. Cit.*, par. 113, p. 56.

and in the course attendant on either, the usual symptoms will cease and be lost by an attack of the disease epidemically prevailing;—this is what medical men call "the convertibility of disease."

There is another circumstance attaching to epidemics which may be considered as constituting a portion of their history, namely, the ascertained effects of *general panic;* for most undoubtedly, in proportion to the intensity of this state of the public mind, so is the impression and spread of epidemic disease.* This is a most important fact, for it leads, in the first place, to shew, that there is what may be called an *epidemic state of the mind,* which materially influences the propagation and spreading of epidemic disease; and, secondly, it shews us how necessary it is on such trying occasions to cultivate by all means a calm, rational, and religiously trustful state of thought and feeling, and to discourage by all means sentiments and emotions of a contrary character.† Hence it is obvious, how fatally injurious is conduct that can only have the effect of creating alarm, and depressing the feelings. I believe no one circumstance is more calculated to disseminate epidemic and contagious disease, than the culpable habit that many persons too frequently practice of going about prophesying woe, spreading ill news, and of adding to or colouring what is reported by aid of the imagination or invention, so as to give their communications an intense interest of a sombre and disastrous character. It is awful to contemplate the extent of mischief an active individual, busily employed after such a degrading fashion,

* "Learned medical writers have endeavoured to shew, that there are epidemics of the mind as well as of the body. The history of disease furnishes us with strong proofs of such occasional inflictions on the human race."—*Collier,* par. 4, p. 10.

† "Sound religion exerts a preventive force against all diseases."—*Collier, Op. Cit.,* p. 69.

may be able to cause and perpetrate in the course of a day, and therefore all such conduct should, for public safety's sake, be avoided as much as possible. The practice, too, of making such themes *unnecessarily* the subject of social and domestic conversation, especially before children,* or encouraging or permitting servants and others to collect news of this kind and to discuss such topics, is highly undesirable. It seems to me to be the first cousin to the bringing disease into a family, which it unquestionably too often does; indeed, it is frequently as contaminating as contagion itself. Almost every medical person of observation and experience can call to mind numerous instances in which illness may be readily and certainly traced to such abominable indiscretion and unenviable love of exciting wonder.

The little Cholera mobs and Cholera coteries, for such they are, which we continually observe collected in the streets and dwellings occupied by the industrial classes, do an infinity of harm; and no less calculated to be hurtful are the "Cholera conversaziones" of the drawing-rooms and servants' halls and kitchens of the wealthier classes.† For my own part, I would almost as soon, so far as safety is concerned, continually live next door to a well planted grave-yard as in such a circle. The business of sickness and human destruction is likely to thrive almost equally well in both localities; for fear is readily imparted and highly contagious, and almost as dangerous in an epidemic season, as the smell of a foul drain or grave-yard emanations; and it were well occasionally that persons guilty of such unsavoury and unsafe conduct should have justice done them, in being

* "Children from very slight emotions of fear will have diarrhœa."—*Laycock on the Nervous Diseases of Women*, p. 173.

† "In all communities, large or small, the spread of an epidemic bears a relation to the panic pervading the community."—*Collier, Op. Cit.*, p. 24.

personally reminded of the nature and consequences of such hurtful proceedings, and ill-timed gossiping propensities.

I have ventured to allude strongly to this circumstance, because I have so frequently seen calamity incidental to the evil practice. It has been truly remarked by Liebig,—"*Disease begins where resistance ends;*" and I would ask, *what more effectually deprives an individual of resistile force, than excessive fear and deficient courage, whether natural or acquired?* What in an army tends more to depress the spirits of the soldiery, and to lessen their vigorous determination, than the "spreading of ill news?" I have, furthermore, adverted to the subject in this place, because it seems to me to form a *most important practical item in the history of epidemics*, and ought to receive weighty consideration on the part of the public.

"Fear doth make cowards of us all."—The best we can do in seasons of Cholera or other epidemics, is "to study to be quiet, and to mind our own business," and to do our duty,—a considerable portion of which consists in doing all the good we can to every body, and ill to none: this tends to tranquillize the feelings and satisfy the conscience; and further, it authorises us justly to expect the kind considerate sympathy and good offices of our neighbours and friends in the time of need. As a matter of "history," so far as I am informed, this plan has answered exceedingly well, and I think it much demands close imitation. It has not, however, been invariably followed. There have been instances derogatory to human nature and degrading to the Christian, in which people have conducted themselves in a cruel and cowardly manner towards the afflicted during seasons of pestilential visitations. Certainly it is no more disgraceful in a soldier (and what can be more so?) to run away and

forsake his comrades, colours, and cause, in the hour of battle strife, than it is in a Christian man to abandon his neighbour in the time of common danger and calamity. In seasons of epidemic peril (to their honour be it spoken) women have been most eminently distinguished for genuine fortitude and steadfast benevolence; for scarcely ever even in such times, have they been known to abandon their post, or exhibit the semblance of fear for self safety, so long as they could be useful in mitigating the sufferings of those they loved or regarded, or to whom they owed duty or allegiance. How often do we see the most fragile and timid of the sex, who may have participated painfully and largely in the *common* apprehension felt, instantly on a calamity befalling a relative, husband, or child, appearing in a new and great character, and exhibiting the most determined courage and firmness, and evincing perfect and praiseworthy indifference to fatigue, trials, or danger, indeed to every thing save the calls of affection, duty, and piety.

I have thus briefly adverted to some points on what may be termed the *practical, popular, and daily history of epidemics.*

As regards the causes of Cholera, I have already observed they are to a great extent obscure,—not more so, however, than are those of many other epidemics. It may, perhaps, be desirable to explain to some extent what the word "cause," as applicable to disease, implies in a medical sense. "Causes of disease are those circumstances which generally precede it, and to the operation of which its occurrence is due. In many instances these circumstances elude our observation. In many of these, the true cause, if apparent, is combined with many other antecedent circumstances which have no share in producing the disease, and yet are liable to be mistaken for causes. These circumstances are to be sifted, and

the true cause discovered only by the attentive observation of large numbers of cases by which disease is produced."*

It must be remembered, that even decided common causes of diseases often will not produce their results, unless there is coexisting in the constitution of the person to whom they are presented a certain predisposition or proneness which is favourable to their operation; thus a "healthy person living in a marshy district may not get an ague until he becomes debilitated by any cause, such as cold or fatigue; then the poison will act."†

Those causes which give such "proneness" or "predisposition" are called the *predisposing* or *remote* causes, those which immediately cause the disease are called the *exciting* or *immediate* causes. Thus in ague just spoken of, the antecedent circumstances, as cold or fatigue and their effects, are *predisposing*, and the aguish attack itself is produced by the effects of malaria,—therefore the *exciting* cause.

To oppose those causes, there is in man, often assisted by favourable circumstances in which he is placed, a protective or resistile power of constitution, which is ordinarily greatest in perfect health. This resistile form is called "vis

* "Principles of Medicine," by Dr. J. B. Williams, p. 5, edit. 1848.

† "*But without his being thus weakened, if the exciting cause be made stronger by his sleeping on the marshy ground itself, then the poison may act without any predisposition, and the ague begins.*"—*Op. Cit.* The consideration of such facts will, to the intelligent, afford significant hints for their conduct and reflections, on causes of disease affecting public health; they will see that the dose of poison or direct "cause," and the "predispositions" also, are to be considered; therefore, that not only is the epidemic to be thought of, but the health of the people and the attendant circumstances,—not only the strength of the epidemic poison, but that which helps to give it power and effect.—G. G. B.

conservatrix;"* and when this is overcome up to a given point by damaging causes, disease is manifested on its incentives being presented. Liebig observes, "Disease occurs when the sum of vital force, which tends to neutralise all causes of disturbance (in other words, when the resistance offered by the vital force), is weaker than the acting cause of disturbance."†

It is, however, to be observed, as may naturally be inferred from the preceding observations, that, generally speaking, the action of both "predisposing" and "exciting" causes is necessary to produce disease, which seldom ordinarily occurs from any one cause, and often from many combining.‡

The *predisposing* causes are numerous, and of these one may suffice, or many may combine, to produce a particular adequate result; and it matters little which, provided the effect is the same, or equal. Hence it behoves the public to know generally what constitutes such *predisposing* causes of disease, and how they act; and it seems to me that *this is the business to some extent of every intelligent person and well wisher to himself or others,*—for whether in the domestic circle, or professional or public life, there is no safety nor certainty in ignorance; and this fact ought to offer a strong inducement to us all to be well informed, notwithstanding we are told on high authority, "no man is bound

* "There is in organized beings a certain conservative power which opposes the operation of noxious agents, and labours to expel them when introduced."—*Op. Cit.*, p. 7.

† Liebig's "Organic Chemistry of Physiology and Pathology," p. 254, edit. 1842.

‡ "A great variety of circumstances and causes may thus act on the body, so as to produce disease."—*Dr. Williams, Op. Cit.*, p. 5.

"Cause never acts simply or singly. One cause suffices not to produce disease."—*Collier, Op. Cit.*, p. 12.

to know every thing."* Lord Bacon also informs us that "boldness is ever blind," and certainly the "bold" recklessness and indifference shewn by numerous persons, even at the present epidemical era, with regard to deadly causes of disease, easily remediable, by which they are surrounded, clearly illustrate the truth of the axiom of this wise philosopher of an earlier age.

The frequent exhibitions of careless and reckless conduct of this kind, considering the high importance and *obvious duty* imposed in such cases of danger, and the solemn warnings offered to mankind from time to time of the evils of neglect, can, even though the perpetrators escape with impunity, constitute no argument in favour of evincing indifference to such evident moral obligations.†

I would here remark, it must be obvious that the fact of varying and apparently conflictive evidence on the point of contagion or no contagion, merely derived from instances observed, which appear to declare for the one or the other, is no irresistible proof on either side, for there can be no clear demonstration until doubt is removed through the investigation of truth. Like the fable of the travellers and the chamelion, an observer in the wide extent of pathology may witness a fact which he may truly declare, and which he may infer to be conclusive on the side which he espouses;

* Bacon.

† The dangerously crowded and disgracefully managed burial grounds, the narrow streets, the open public ditches and drains and stagnant waters, the ill scavenged streets and unflushed sewers of towns, the neglected cesspools and drains, and the crowded state of private houses, the dirt and filth and ill ventilation of many of these and of factories and work-shops, are all striking and terrible instances, verifying the truth of Lord Verulam's aphorism, and clearly shewing that there are many in public, private, and clerical life, and even whole communities, who are "*very 'bold' indeed!!*"

another may witness an instance of a perfectly opposite nature, and may with as much propriety and equal pertinacity maintain his own deductions to the contrary; whereas it may turn out eventually, that although both have truly and faithfully declared what they observed, still a third party may have seen that which indisputably proves that they have only observed and made known *part of the truth*, although they unquestionably stated with veracity that which they witnessed and believed.

I think it will be found that such is unquestionably the case with Cholera,—namely, *that occasionally it is contagious, and often not so.*

I think there is nothing very extraordinary in this, supposing it to be true; it seems to me rational to expect it would be so, and to believe it on the merits of the evidence without much hesitation.

I am aware that in stating these convictions, I am placing myself in opposition to some of the most eminent medical authorities. On the other hand, the views I have advanced seem in some instances to be practically adhered to, whilst in others they receive the decided advocacy of writers of equal medical pretensions. I may here remark, the subject is one on which recent authors have received no light of personal experience in our own country prior to the year 1817, when the cholera first appeared amongst us. And it is obvious that now, in districts where the disease is present, we are being furnished with enlarged and increasing materials from which to form a judgment respecting the contagious or non contagious nature of the disease.

Sir James Annesley has declared it to be his conviction, that Cholera is not a contagious disease. The medical board of India declared for non contagion.* Dr. G. Budd, in

* Dr. James Johnson, Op. Cit.

the paper already referred to, sides with the non contagionists, and the metropolitan sanatory commissioners have arrived at a similar conclusion.

Mr. Bell, who had seen much of the disease, and who wrote a treatise on Cholera in 1832, ridicules the idea of contagion; and the late Dr. Fergusson, who had large opportunities for observation, is equally positive in expression of the same opinion. Dr. James Johnson seems to leave the subject for future decision; and Dr. Parkes, in his admirable treatise, entitled *Report on Cholera*,* appears to have a similar inclination. Indeed, whatever may be the opinions expressed by any one as to non contagion, I think there can be no doubt whatever, looking at facts, but that the generality of authorities, *learned and official*, seem by no means indisposed *to act on the side of caution;* and as the causes of Cholera are undoubtedly "obscure,"† it is very proper that all persons of discretion should follow this prudent example.

It is due to the reader here to state, that Dr. Sutherland, of Liverpool, whose sphere of observation has been most extensive, and Mr. Bowie, of London (both gentlemen being inspectors to the board of health), have expressed to me personally their entire conviction that Cholera is not a contagious disease.

No one, however, so far as I am informed, appears to deny that it is capable of localizing itself; and when so localized, of abiding for a season, and laying hold of all within its reach who are constitutionally "predisposed" to its attacks.

Dr. Greaves, I go on to say, whose opportunities have been great, appears to lean to the side of the contagiousness

* A most important document.

† "Its causes are very obscure."—*Marshall Hall.*

of Cholera, and to attach great weight to the evidence in favour of this view of the subject. Certainly the judgment of one who has so closely observed, and who has so admirably adorned the page of medical wisdom in recording the practical results of his experience, is entitled to great weight. Dr. Watson, also, is in favour of the communicability of Cholera. Sir Gilbert Blane held the same opinion, and so does Dr. Elliotson. Dr. Browne, the author of the admirable article on Cholera in the Encyclopædia of Medicine, expresses his convictions to the like effect; and Dr. Copeland, whose inquiries into the subject have been most extensive, patient, and laborious, appears to me to offer evidence of the most weighty kind as to the communicability of Cholera,—the more entitled to weight on account of his extensive medical acquirements, and his habits of close inquiry into pathological history. Doctor Gregory likewise expresses his opinion in favour of contagion in Cholera.

I will not go further into the subject matter of difference; enough has been said to shew, that such differences of opinion do exist amongst men of the highest intellectual attainments and matured experience; notwithstanding this, it may be hoped, and I believe, that ere long these discrepances of opinion will be settled by more extended inquiry, and the results of further investigation.

Now, I would ask, why it should be supposed that Cholera is incapable of being propagated by contagion? why unable to spread by communication with the sick? It was for a long season debated what continued fevers were contagious, and what were not so; but more patient inquiry seems to have settled the point, namely, that it is the nature and character of *all continued fevers* to be contagious.*

* See Dr. Watson's Practice of Physic, vol 2, p. 499; also Dr. Christison's Paper on Fever, Library of Medicine, vol. 1, p. 158.

Indeed it may further be asked, is not Cholera itself a fever? I think there is no doubt of it. Dr. Billing has very plainly stated this as a fact,* and so have many others. Moreover, this view of the subject seems to me to be one not easily controverted.

Although it is the nature and property of continued fevers to spread by contagion, it does not always follow that they must do so, for often times they do not; but yet it may be, and is, their property and tendency, as a class and as a general rule, although not invariably, for exceptions frequently occur. I think this same rule applies remarkably to Cholera,—not by any means, generally speaking, one of the eminently contagious diseases.†

There are some observations from the elegant and accomplished pen of Dr. Holland, in a paper (published in his "Medical Notes and Observations"), entitled, "Method of Enquiry as to Contagion," page 276, 2nd edition, which are in my judgment of the greatest use and importance in guiding the inquirer in the investigation of this subject. After alluding to certain points, all of intrinsic moment, necessary to be inquired into in the study of contagious diseases, he says, "Duly considering these several points, they will be found, I think, to shew adequate cause for all the

* "I consider Cholera an essentially febrile disease, whether it assume the remittent or intermittent form."—*Principles of Medicine*, edit. 1849, p. 248.

† See Mayo's "Outlines of Pathology," where some most judicious remarks may be found.

"The Asiatic Cholera, like any other epidemic, may be pronounced to be not appreciably, but weakly, capriciously, and inconsiderably contagious for a month or more, and shortly afterwards it may become decidedly communicable, so that proximity and inhalation, in common with the sick, may become a formidable assisting cause, to make up, along with other forces, the aggregate sufficing force."—*Collier, Op. Cit.*

strange and perplexing appearances of contagious disease. So far from its being difficult to explain why a given disorder should occasionally appear infectious, at other times not,*—why it should spread rapidly and virulently in some localities, and not at all in others,—why it should affect some persons, and leave others free,—why the cases should be violent at one period, and mild at another,—it is rather, perhaps, matter of wonder that the circumstances are not still more varied and irregular than we find them to be. Where there are such numerous and ever changing elements of difference, the combinations of these may well give scope to every assignable variety of result."

The *three main heads,* which, according to Dr. Holland, principally deserve consideration in respect to the apparently singular variations we witness in observing the laws of contagion, and which remarkably influence such phenomena,—are, first, the condition of the person having the infection; secondly, the state of the person receiving it; and thirdly, the condition of the medium through which the transference is made.† "I believe," says this able writer, "that reflection will shew *the whole subject to be comprised under these three heads; and that we are bound to refer to them severally, all particular questions or instances which come before us.*" Dr. Holland further observes, in reference to what I have just quoted, "It is clear that very many of the contradictions of opinion and statement, as to the contagious nature of certain diseases, may be solved by a reference to these considerations."

* "He who thinks that Asiatic Cholera, or any other malady, *must* either be infectious or not, is only clinging to a logical quibble."—*Collier, Op. Cit.*

† A most extended, varied, and interesting field of observation and enquiry.

I would further state, it is my belief that a perusal of this admirable paper will amply reward any impartial seeker after a truthful interpretation of the laws of contagion. Controversy, in my humble opinion, does far less good than patient investigation; patience will "do its perfect work," which controversy seldom accomplishes, as we may well expect when we know that too many of those engaged therein, *will see nothing but what they believe*, whilst others will believe nothing but what *they* see.

One most important and encouraging ascertained truth, amidst all the doubt, controversy, and dismay, by which the nature and the history of contagion are surrounded, ought to engage the attention and quicken and direct the exertions of every good member of society—viz., "experience shows that, however fatal the character of any epidemic, and however imperfect our knowledge of cure, an early recourse to rational and prudent aids lessens the aggregate mortality ensuing therefrom."*

I have thus endeavoured in some measure to show generally what is the import of the question regarding contagion in Cholera. No doubt, however, exists but that the more important and primary question is, in what does the visitation originate; and I think the answer certainly is, that it arises out of *epidemical influences*. On this part of the subject I proceed to offer a few remarks.

On the epidemical nature of Cholera.—This is a most important topic for consideration and discussion in two aspects;—the first, as to the nature of epidemic force as a cause in inducing disease, in other words, epidemic force "per se;" and secondly, with reference to those causes and circumstances which assist in adding to its power, and giving it a greater tendency and facility to spread.

* Collier, Op. Cit.

Supposing (to use an arbitrary mode of explanation in numbers) that the sum of cause or causes required to produce the given effect is *five*, then, if the epidemic force were equal to *five*, it would attack any one with whom it came in contact; but supposing it were equal to *three* only, it would not affect a healthy individual; but if the additional *two* were made out by intemperance, fear, anxiety, bad air, or other cause or causes, the effect would be the same, or equal to the same, as if the necessary number were made up of epidemic force alone.

The word "epidemic" scarcely in its literal sense implies the meaning conventionally attached thereto, for it means in its archæological sense "on or upon the people;"* whereas it is usually received in its medical meaning to imply, an occasional travelling visitor, in the form of sickness, abiding in and haunting the abodes of man in its progress for a season, and then disappearing, it may be, to return again. There are three terms of this kind in vogue—viz., "epidemic," just referred to, and "endemic,"† a word implying diseases which are usually found existing amongst communities, either with reference to their locality or calling, or both, as "sea scurvy" may be said to be endemic amongst sailors, and "goitre" endemic in some of the valleys and gorges of Switzerland; the third term, "pandemic,"‡ signifying all the people, is used to imply that a disease, of an epidemic kind, affects the whole population generally.

The epidemic character of certain diseases is not only a remarkable but most important circumstance. Their influences appear to visit, and impart certain properties to, unhealthy places, in which other diseases are ordinarily found, or even healthy places, to which no diseases are pe-

* επι, upon, and δημοσ, the people. † εν, in, and δημοσ, the people.
‡ παν, all, and δημοσ, the people.

culiarly attached; and also act upon causes which usually produce certain illnesses, so that these illnesses shall be changed or converted, and invested with the type, nature, and power of the prevailing epidemic. Thus epidemic Cholera will sometimes suddenly appear in apparently healthy places, where no disease before existed, and where none could be well expected to appear; but it will more certainly invade unhealthy localities or impure dwellings, *ill ventilated houses*, the neighbourhood of foul drains, open cesspools, &c., formerly the abodes of typhus and other fevers, and ravage such places, to the exclusion of the fevers before prevalent.

It will again select for its victims the weakly, the fear stricken, and the intemperate; but even the temperate and healthy will not invariably be exempt from its attacks. Its abode is uncertain, and its stoops or pounces are often sudden and capricious; its type and fatal character also are very varying, inconstant, and ever changing.*

Many other diseases have similar attributes, and against these, in the same manner as against Cholera, full health furnishes no certain security; yet the prone or predisposed are, for the most part, the victims. Healthful localities again do not possess entire immunity, for they are occasionally the seats of the ravages of disease; yet places of a contrary nature are the chief scenes of its presence and its power, and supply the greater number of fatal cases. The abodes of plenty are not *safe;* but the dwellings of want, woe, and wretchedness are far less so.

* We frequently find Cholera, in a place affected, to be one week deadly in its effects, and utterly bidding defiance to remedies; in the next it may be more benign and readily controulable by curative agents. It is also remarkable that its type and intensity may at the same time greatly differ at places within a short distance of each other.—G. G. B.

The mortality of Cholera has been great, but in this country many other diseases that have not excited the same attention, nor caused so much dismay, have proved *equally* or even *more* destructive. Such diseases, however, have not appeared so appalling to the public, for a reason (as I think) given by Dr. Mayo, on the authority of Magendie, viz., that "Asiatic Cholera begins where other diseases end,—in death."* If this assertion is of any practical value, and I believe it is of great intrinsic importance, it means that in the treatment of Cholera *there is no time to be lost,*—for doubtless, although Cholera will, like *many other of the fever class,* kill rapidly and oft times suddenly, particularly in the warmer latitudes,† still there is no doubt but that a very large proportion of its victims might have been saved had they applied proper remedies in time; that is, *on the instant or advent of the attack, particularly in cases where the attack of malignant Cholera is preceded by diarrhœa.*

Great as the ravages of Cholera have been in this country, they are even as nothing compared with what they have been in some others. The following extract from Dr. G. Budd's paper will serve to shew the correctness of this remark :—"The mortality occasioned by Cholera has probably been greater than that caused by any epidemic disease that

* It must be remarked, that a vast number of fatal instances of Asiatic Cholera are so, simply because remedial agents are neglected and their use deferred, until, by reason of the unchecked progress of the disease, it has become fatal. It were equally futile to talk of curing neglected inflammation of the bowels, when it had passed into gangrene or mortification, as it is to hope to cure Cholera, neglected until fatal symptoms are present.—G. G B.

† *Many* diseases of the fever class kill suddenly; for instance, such was the case with the plague at Marseilles. See "Morgan and Addison on Poisons." Such also was the Bengal fever. "See Billing's Principles of Medicine."

has existed for several centuries. In Jessore, at the time of its outbreak in 1817, 10,000 persons died in the first two months. The mortality was scarcely less in some other towns in India; and it has been computed, that in that peninsula, from 1817 to 1830 inclusive, the number of deaths from Cholera amount to eighteen millions, in a population of somewhat more than forty millions. We have only extremely vague and scanty data respecting the ravages of the disease in the countries of Asia, not subject to European dominion; but there is reason to believe, that in some of these they were still greater than in India.

"In some of the towns of Arabia and Persia, the mortality is said to have amounted to one-third of the population. In Russia, in 1831, one-twelfth of the population of the infected provinces is supposed to have been attacked, and the mortality to have exceeded 60,000 persons. In Paris, during the epidemic of 1832, more than 18,000 fatal cases are said to have occurred. In this country, the ravages of the disease have been much more limited. In 1832, probably 5,000 persons perished from this cause in the metropolis, and the number of deaths reported in Great Britain was somewhat more than 20,000."

I wish also to record my entire conviction, that notwithstanding the capricious visits, the sudden invasion, and the fatal effects of Cholera, I am fully persuaded the mortality and frequent attacks would not be half so prevalent in communities, were proper sanatory means adopted and persevered in.*

* Every fact regarding truth is valuable; and it may be observed, that in the town of Swansea and village of Morriston, in the year 1832, when sanatory measures could scarcely be said to have been resorted to, excepting on a most limited scale, the deaths in these two places conjointly were between 300 and 400; whilst at the present visitation in August, 1849, the total deaths in these two places (sanatory means

What is the nature of an epidemic, and what its sources and origin? This is a most important question; and in the present state of our knowledge, the true answer to it cannot be given. We can explain many things in their effects, and so we can and do explain many things as well as we can, in words and surmises; but this is not clear, plain, effective truth, at least oftentimes it is not so.

I believe the sources of epidemics vary as much as do their effects. *It seems to me futile to look for one cause only of epidemic disease.* It is true, under different circumstances, one cause only may produce different effects; but I can hardly believe such to be the case in epidemical influences, their manifestations being so totally at variance with such a view.

having for months past, particularly at Swansea, been persistingly enforced) have only been about 170, not only including the places before mentioned, but the whole vast extent of the Swansea Union, comprising a population of upwards of 46,000. (August 30, 1849.) This striking fact is of great value. For months before the present advent of Cholera at Swansea, the Mayor and the Chairman of the Board of Guardians, Mr. Llewelyn, of Penllergare, anxiously endeavoured to prepare for the struggle with this expected foe, and energetic means were promptly put in force and persevered in. The results hitherto have been most satisfactory; in addition to other means, Mr. Smith, the managing Director of the Swansea Water Works, liberally placed the water mains at the disposal of the authorities gratuitously. This plentiful supply, in distributing which the fire engines were and are constantly called into requisition, both for washing streets and flushing drains, has contributed largely to public protection. I think I am doing but justice when I deliberately and unhesitatingly affirm, that the three gentlemen alluded to have, by their zeal, promptitude, and persisting exertions, been the means of saving hundreds of the lives of their neighbours and fellow subjects; and I earnestly hope that they and all concerned, who have been hitherto so zealous, will persevere, for much yet remains to be done with a view to fully effective sanatory regulations; for instance, witness the detestable and open town ditch, and the numerous untrapped gratings in the streets; these will cost large sums ere effectual remedy will result,—but these sums will I trust be forthcoming.

The earth is a great chemical laboratory, and so is the atmosphere by which we are surrounded,—so are the waters on, and under, and above the earth,—and so are all animal and vegetable organizations.

What a variety and infinity of extent for thought, investigation, and proof does such a short view of this matter offer! How difficult the approach to this vast subject,—how hard to unravel its intricacies,—how arduous to unfold and make plain its varied complications,—how laborious the task of tracing the relations of those causes which so continually and stupendously act and react on each other. From its vastness, it must seem the work of ages; and from its geographical extent, and inevitably ever varying phenomena, developement of the subject must be the task of many men employed thereon at different periods of the world's history. Would that whatever is already known were ably collected together, and the reasoning to be derived therefrom ably conducted in the true spirit of truthful enquiry. I am fain to think, that the life of one great man would be usefully spent in this task,—the result, whilst beneficial to mankind, would be the means of immortalizing the individual who successfully pursued the important inquiry: none but a truly great mind could effectually accomplish this undertaking, for such only could bring together this vast subject, —clearly unravel, arrange, and make plain the information he might collect.* There are such men to be found, but men must live, and fortune does not always shower her favours, or readily supply even the common necessaries of life, to men of great intelligence, or varied acquirement; for we have too many melancholy instances to the contrary every day.

John Hunter, whose great mind was endowed with powers and perceptions of the highest order, clearly perceived the

* "Salus populi suprema lex."

important circumstance, that amongst the poor of large cities new poisons were constantly being generated and modified by the force of epidemical influence; and the experience of mankind, on further investigation, has fully verified the truth of his opinions. Will no one man devote himself to the arduous task just adverted to? Will no liberal government aid such a man in this full work of a long life?

The same great man, Hunter, told another great truth, namely, that the cause of dissolution in yellow fever, was "death of the blood." This truth also has been verified, for blood poisons, and their consequences, are now found to constitute a vast amount of death and disease.

I am firmly persuaded that "necræmia," or death of the blood, is the fatal cause of Choleric disease,—another "fever,"—but still by the force of "epidemical influence," the modifying agents of the particular poisons which generate disease.

The intemperate, the fear stricken, the dirty of mankind, are always present; the noxious stenches, unwholesome ventilations, ill lighted dwellings, cesspools, gully-holes, drains, and stagnant waters,—poverty, want, and rags,—ever are to be found; but it is only under laws of epidemical forces that we find Cholera or other epidemical diseases. Then what is this epidemical force which performs such an important part? what this occasional malign visitor, armed with death, which in so many guises visits and destroys the children of men,—converting ordinary diseases into pestilences, and unwholesome places into pest houses and cemeteries?

Some have said electricity was the principal agent; others, that flights of aerial animalculæ carried this deadly influence. Others again declared it was generated in a given locality, as in marshes, &c., and borne by the winds over the world. Some have declared that emanations from the

earth produced these afflictive results. Others again, lovers of the miraculous, have affirmed that Providence directly and miraculously afflicted mankind for divers reasons, ascribed by them as just causes for their punishment. It cannot be denied, but there are those who see Divine interference in a broken leg, and retributive justice in the fall of a foe,—and with whom the misfortunes of their enemies are all *judgments*, whilst their own are merely *trials*. I shall not discuss this portion of the subject,—the ways of Providence are above our ways. Others have been of opinion that a given disease, once generated, was borne over the world by travellers, who communicated it in their progress; and that merchandise also carried it about in the shape of "fomites,"—conventionally meaning that clothes, bales of goods, and the like, imbibed under certain influences the fatal poison, and again, under other circumstances, dealt it out. Others again speak of "constitution," or particular state of the atmosphere, as the cause.

These, I believe, are the principal causes assigned; and it is a great question to me, if it be not to most of these causes, together with others not yet discovered, and their different combinations, that we are indebted for these visitations, and for their various forms.

It is foreign to my purpose here to discuss at any length these various causes, their value, and importance; I will merely glance at some of them.

No doubt, *heat, light, air, moisture, and electricity*, perform some of the most important phenomena in nature; and we naturally turn to these, as believing we shall find in them equally important phenomena displayed in influencing or producing diseases. Who can doubt it?

The vicissitudes of heat and cold will, we know, produce illnesses. Absence of light, we know, influences health re-

markably. (I regret daylight is in this country so highly taxed.) It would be absurd to institute an argument merely to prove that different states of the atmosphere, and also its various acquired pollutions, influence the animal frame; it is familiar to us as a fact, and perfectly plain to the evidence of our senses. That the different degrees of moisture and dryness of the atmosphere, together with what in those states it contains, play important parts, there can be no doubt; we are all equally cognizant of this fact; so also are we that the quarters whence the winds blow influence health remarkably.

With respect to the importance of electricity, its power is easily recognized by asking one simple question, viz., *where does it not exist, and what does it not influence?*

It is clear, therefore, that the causes above named do greatly influence health and disease, and to what extent may be imagined by considering the very few primitive colours, and what various and endless results are derived from their combination; or by reflecting on the few letters which comprise an alphabet, and the numerous words and varied meanings these are capable of expressing by being judiciously placed; the same with numerals, in figures. There seems to be no end to effects and results.

How vast again are the powers of the human understanding; and yet it appears that, as in the former instances, it is comprised of few and simple elements, and that by their combination great and miraculous results are devolved.*

* See Conolly on Insanity, page 52. "The faculties, if we may so call them, without being involved in disputes, of attention, memory, imagination, and comparison, are the great attributes of the human understanding; of which, existing in perfection, the results are various acquirements, correct opinions, sound judgments, wise determinations, and reasonable actions. Reasoning is nothing more than their successive or continued exercise; and what we call reason, is but the product of this exercise!!"

It requires no great reflection to estimate the several influences, namely, light, heat, air, moisture, and electricity, to which I have alluded, at their just importance and value; and singularly important and valuable they are, whether considered as directly or indirectly, respectively causing, modifying, or conveying diseases themselves, or as exercising a power over the human frame, and according to circumstances preparing it either to receive diseases when their causes are presented, or otherwise assisting in the exertion of a resistile force in protection against them.*

The effects of light and heat, *i. e.* different temperatures, in influencing diseases, or as chemical agents in producing results in nature, are sufficiently evident to all ordinarily well informed persons, to render it unnecessary that I should dwell on such causes. That they have great effects is self evident.

With regard to the atmosphere, as a medium of conveying poisonous material or "malaria," that too is familiar to us all.—See page 9.† As regards the state of the atmosphere, no doubt this "constitution" of the atmosphere,‡ or "constitutio anni," as it is called by some authors, is often of vital importance in influencing health or disease, parti-

* See Dr. J. B. Williams's Principles of Medicine, 2nd edit., sections 74, et sequent; also sections 82 and 84, et sequent.

† See Boyle on the Fevers of Africa, pp. 258 and 268.

‡ "Rapid atmospheric vicissitudes, in regard either to temperature or moisture; exposure of the body to currents of cold air, particularly the chill of the evening, after being heated by violent exercise of any kind, inducing debility or exhaustion; low marshy situations; flatulent or indigestible food, especially crude and watery vegetables, which compose a large proportion of the diet of the natives; and particularly that gradual undermining of the constitution which arises in a condensed, dirty, and ill-fed mass of population,—are all unquestionably powerful predisposing causes."—*Dr. James Johnson "On the Influence of Tropical Climates,"* p. 282.

cularly, as I believe, in common with many other persons, in reference to its *electrical state*. *As regards electricity*, to which I will now briefly advert, I will first offer a few observations of a general character to shew how far such cause *is likely* to influence disease and death. "In clear weather, indications of free positive electricity are always to be met with in the atmosphere; this is weak before sunrise, becoming stronger as the sun passes the horizon, and soon afterwards gains its greatest state of intensity; it then rapidly diminishes, and regains its *minimum* state some hours before sunset; after which it once more increases, and gains its second *maximum* state, which then decreases until the following morning. M. Schubler, of Stuttgard, to whom we owe the above observations, has remarked that the atmospheric electricity increases from July to January, and then decreases. It is also much more *intense* in *winter* than in summer, and appears to increase as the cold increases."

"Among the causes, modifying the electric condition of the atmosphere, must be ranked the hygrometric state, as well as, probably, the nature of the effluvia which may be volatilised in any given locality. Thus, Saussure has observed that its intensity is much more considerable in elevated and isolated places, than in narrow and confined situations; it is nearly absent in houses, under lofty trees, in narrow courts and alleys, and in enclosed places. In crowded cities it is most intense in the squares, and upon the bridges. In some places the most intensely electric state of the atmosphere appears to be that in which large clouds, or dense fogs, are suspended in the air, at short distances above the surface of the earth; these appear to act as the conductors of the electricity from the upper regions."*

* "Elements of Natural Philosophy," by Golding Bird, A.M., &c. &c., chap. 16, p. 215. The following also bears on this question:—

This extract indicates where and when atmospherical electricity appears to be active, and where and when not; and on comparing such localities and times, we may by inference draw some deductions from these facts. In further illustration of the foregoing observations, I would observe, that if any person were shut up for some time in an apartment, no matter how lofty or well ventilated, he would experience great change, and derive great comfort, on being again permitted to revisit the exhilarating open air. Again, how lifeless comparatively is the air of a forest; how different that of a close valley gorge, in contrast to the hill side or mountain top; how different the narrow close street to the fine open square, or fields; how remarkable the difference between breathing the atmosphere on the ground floor of a dwelling, and the air on the house top; how close and unrefreshing is the air preceding a thunder storm.

Much of great importance and deep interest relating to electricity, as an important agent in organic life, will be found in the respective works of Liebig and Muller, and in the interesting physiological publications of Dr. Carpenter. Dr. Golding Bird, in his highly instructive lectures on "Electricity and Galvanism in relation to their Physiological and Therapeutical Relatives," page 14, comes to the following conclusions:—He observes, "In summing up the foregoing facts, we are, I think, justified in concluding that a mass of evidence has been adduced demonstrative of the actual existence of electricity in three states in the body. 1st. In a state of equilibrium, common to all forms of ponderable matter. 2d. In a state of tension, capable of acting on the electrometer, giving to the whole body a generally positive condition, and arising, in all probability, from the disturbance of the normal electric equilibrium by the processes of evaporation and respiration. 3d. In a state of current, a dynamic condition, arising from the disturbance of equilibrium by the union of carbon with oxygen in the capillary system, and from other chemical processes going on in the body; such currents, although *suspected* to be every where existing, having been actually detected between the skin and mucous membrane, the stomach and liver, and the interior and exterior of muscular structures."—*Golding Bird on Electricity and Galvanism*, p. 14.

All these sensible differences are within almost every man's observation and experience; but chemically no appreciable difference can be discovered, nothing more nor nothing less can be detected in the air of either place.* The important fact noticed in the foregoing extract of Dr. Golding Bird, namely, that great variations occur in the electrical condition of the air, is then, I apprehend, one of the chief causes influencing health in reference to the atmosphere.

Again, atmospherical electricity differs greatly in different winds; in the dry east wind it can scarcely be collected,—in the moist southerly gale it is abundant. The fluctuations of health, the feelings of health, consequent upon these respective prevalences of wind, are well known.

In certain electrical states of the atmosphere, as also in its *different degrees of moisture or dryness,—its hygrometrical states,*†—how the gutters smell, how offensive are drains, cesspools, and the like, and this often suddenly.

* "The human constitution is a delicate instrument, and can perceive qualities which our philosophical instruments and chemical tests do not enable us to detect."—*Dr. Gooch's Paper on Contagion of Plague.*

† Speaking of malaria, Dr. J. B. Williams says, "a damp state of the atmosphere favours its production, good fires in a house give marked protection to the inmates."—*Op. Cit.*, par. 83. Dr. J. Johnson also makes similar remarks, and cites some striking and interesting facts.—*Op. Cit.* I think these suggestions valuable with reference to Cholera, so far as my observation serves.

N. B. With reference to heat and moisture, it does not seem necessary that, under favourable circumstances for effecting mischief, stagnant water must necessarily be mixed with decaying animal or vegetable matter. "It is not only marshy and low grounds that engender malaria, although these are the situations commonly most favourable for its production. All that seems to be requisite is, the continued operation of the sun's heat on moisture, stagnant at or near the surface of the earth."—*Dr. J. B. Williams, Op. Cit.*, par. 84.

No doubt when stagnant water or moisture so situated, receives addition in being commixed with animal and vegetable impurities, the effects produced are likely to be more serious and fatal.—G. G. B. Dr. James

I think then it seems clear that to the electrical condition, together with the *moisture** contained in the atmosphere,

Johnson, in speaking of "malaria," observes, "It is *aqueous vapours hold them in suspension.*"

N.B. I believe the truth of this last observation may in some measure be inferred from the fact, that the fine nose of a sporting dog is much at fault, if the air is too dry,—"the scent does not lie well." Again, as to the winds bearing miasmata, I may observe the well-known fact, that a dog will hunt better "up the wind," than down. Further, I may suggest to the reader the vast distances at which some animals will scent their prey, or detect their enemies,—wind, and the hygrometrical state of the atmosphere, being favourable.

* A short time ago, an elderly man was employed in this town, in damp muggy weather, to work at alterations in the cesspool of a privy; —at length he became ill, and was shortly seized with lock jaw, and died. Again, Dr. Taylor, in his work on poisons, affirms that emanations, such as are alluded to in the foregoing note, will produce "tetanus" or lock jaw, and also "Cholera."

The following also seems to bear on the same point:—

"The human body is greatly influenced by the quantity of aqueous vapour present in the atmosphere, and few subjects connected with meteorology are more interesting to the medical philosopher. How far the origin of various epidemics may be connected with it, future observations may probably discover. Increased humidity is ever attended with the sensation of cold, because the air is thus rendered a better conductor of caloric; while at the same time, it checks perspiration, since the atmosphere, when in a state of saturation with water, is incapable of carrying off the insensible perspiration as it is formed. Under these circumstances, the perspirable matter is condensed upon the surface; hence we appear upon these occasions to perspire greatly upon the slightest exercise, whereas the cuticular discharge is at such times absolutely less; and since it must cease to be a cooling process, we experience a sensation of heat greater than the state of the thermometer will explain. The extreme dryness of the atmosphere of Chili will furnish us with a number of facts in further proof of the justness of these views. Dr. Schmidtmeyer informs us that in the climate alluded to, notwithstanding the very high temperature, the perspiration passes off so entirely in the insensible form, that, during the most violent exercise, it might

much relating to the activity of malarious and epidemical poisons must be attributed; and I am further disposed to believe, that the electrical condition of the *human body*, like-

be doubted whether there existed any perspiration at all. When the air is loaded with moisture, the watery exhalation from the lungs also is diminished, and various morbid effects may be thus produced. The subject has not hitherto received a share of attention commensurate with its importance. The investigation might not only lead to an explanation of many phenomena which are at present unintelligible, but to the adaptation of an artificial atmosphere for the cure of disease. It, moreover, deserves notice that a humid atmosphere becomes a more powerful solvent of vegetable and animal substances. Numerous examples might be adduced to show, that volatile bodies are sooner converted into a gaseous state under such circumstances. It is well known to lime-burners, that the limestone is burnt and reduced to quick lime much sooner in moist than in dry weather; and, indeed, in the latter case they not unfrequently place a pan of water in the ash-pit, the vapour of which materially assists in carrying off the carbonic acid. In like manner, camphor is found to volatilise with much greater celerity in a damp situation. Every body has noticed how sensible the perfume of flowers becomes during the fall of the evening dew, or in the morning when the dew evaporates and is dissipated by the rays of the rising sun. For the same reason, the stench of putrid ditches, and common sewers, is conveyed to the organs of smell much more speedily in summer previous to rain, when the air becomes charged with moisture. We cannot, therefore, be surprised to find, that heat and moisture have ever proved favourable to the origin and propagation of epidemic diseases. The most subtle of all poisons,—*the matter of contagion*,—is undoubtedly modified in activity by the degree of moisture in the atmosphere influencing its solubility and volatility. On the other hand it may be stated, that the *harmatton*, a wind experienced on the western coast of Africa, between the equator and 15° north latitude, blowing from north-east towards the Atlantic, and which, in consequence of its passage over a very extensive space of arid land, is necessarily characterised by excessive dryness, puts an end to all epidemics, such as the small-pox, &c.; and, it is even said, that, at such a time, infection does not appear to be easily communicable by art."—*Klein Grant's "Medical Dictionary,"* 7th edit., p. 210.

wise influences health and disease. This latter subject offers a wide and useful field, hitherto scarcely trodden, for information.*

Undoubtedly, then, this "constitution of the atmosphere," whether *seasonal* or *epidemic*, is an interesting fact; and true it is, that it influences many diseases, and gives rise to many; *seasonal periods* have their peculiar tendencies, as well as epidemical periods, as every professional person has ample opportunity of observing, and some of them are not very explicable.†

* The facts ascertained, with regard to free electricity in man, are the following:—As a general rule, the electricity is positive,—but in the female more generally negative than in the male; it is more abundant in sanguine temperaments, than in the lymphatic; greater in the evening than in the morning; greater when the temperature of the body is high, than when it is low; it is increased by spirituous liquors, and reduced to zero in rheumatic affections; the free electricity of the body is generally of very feeble intensity, but in certain states of system, the body has given out sparks in great abundance.—*Dr. Guy's edition of "Hooper's Physicians' Vade Mecum,"* p. 73.

I may here add, that about a year and a half ago, on one frosty morning, I went to a hairdresser's shop, to get my hair cut; and in the process I heard a singular cracking noise, respecting which I inquired of the barber, who informed me it proceeded from the comb passing through my hair, and added that it was not uncommon. The noise much resembled that proceeding from friction on a cat's back; and I have no doubt, but that had it been dark, sparks would have been elicited from the disturbed electricity. The noise was loud and remarkable,—but I had never observed it on any former occasion, nor have I since.—G. G. B.

"Duhamel saw a young stalk of barley grow six inches, and a vine shoot almost two feet, during three days of electrical weather."—*Carpenter's Comparative Physiology*, p. 224. The same author observes, "The mode and degree in which this agent operates on the living system, is one of the most obscure, but one of the most interesting questions in physiology."—*Ib.*

† But besides those conditions, seated within the organism, which predispose to diarrhœa, and those occasions furnished from without by the

I have ventured to offer some opinions on this subject, not because they originate with me, for I am aware that many hold and have held them, but because I entertain them strongly, and think I perceive much reason for believing they are true. The power of atmospherical influences has long been observed, acknowledged, and recorded. Our own Sydenham, the giant of his age in the philosophy of medicine, did not fail to remark and appreciate their influence; and the correctness of his perceptions have been verified by the experience of the best practitioners and philosophers who have succeeded him. As regards electrical influences, and the influences of the weather, the writer whom I have before quoted, viz. Dr. Holland, has ably advocated both; and in his work will be found much to enlighten and reward the enquiring and truth-loving mind.*

Still, after all, we have much to observe, much to search after, and much to discover, ere we shall be able to define clearly what it is that constitutes the nature and properties of

food with which the child is supplied, *atmospheric influences* constitute a third and very important class of causes, which at one time render diarrhœa very frequent, and at another greatly check its prevalence.

"On a comparison of the results of five years' observation at the Children's Infirmary, I find that—

In the 3 mo.	Nov. Dec. and Jan.	Diarrhœa found	7. 2.	per cent. of all classes of disease.
„	Feb., March, and April	„	8. 3.	„
„	May, June, and July	„	13. 0.	„
„	Aug., Sept., and Oct.	„	24. 4.	„

—*Dr. West, on Diseases of Children*, p. 389.

Drs. Maunsell and Evanson, again, speak of "infantile eresypelas," as occurring usually at times when the "constitutio anni" is of a "typhoid character."—*M. and E. on Diseases of Children*, p. 222.

* "Electricity may be concerned in favouring the generation of malaria, whatever its nature; or it may induce a state of body more liable to be affected by this, or by other causes of disease in activity at the time.

an epidemic, and what are its causes,—truly are they at present called "*non cognizable agents.*"

OTHER CAUSES WHICH APPEAR TO INFLUENCE FEBRILE EPIDEMICS, PARTICULARLY CHOLERA. On these I will briefly remark; and, in the first place, will advert to those which are found in or near habitations.

Dr. Guy has remarked,—"My own opinion is, that fever is a contagious disease, spreading from person to person, just as scarlet-fever or small-pox does; and, like those diseases, haunting over-crowded or ill-drained districts, and all places where, from any cause whatever, the air is foul or filled with animal and vegetable emanations. It loves the banks of rivers, the borders of marshes, the edges of stagnant pools; it makes itself a home in the neighbourhood of cesspools and badly-constructed drains, and takes especial delight in the incense of gully-holes. It has a perfect horror of fresh air, soap, and whitewash; but when left to itself, it will linger for years amidst scenes of filth and corruption, and hold in its deadly embrace all human beings

We have proofs on which even to approach towards assurance, but there is presumption from several sources that this great agent cannot be wholly inert, as respects either of the conditions in question.

"Though unable, then, to affirm any one disease to be actually produced by electricity, yet, considering the subject in its whole extent, it is impossible not to see the likelihood of its influence in the body on the many ways hitherto undistinguished, or not understood. If a stroke of lightning can in an instant destroy muscular irritability throughout the system, and prevent the natural coagulation of the blood, either directly or indirectly, by hastening putrefaction,—it is clearly to be inferred that lesser degrees of the same action must have definite effects, bearing proportion to the intensity of the electrical changes or transferences taking place. The conclusions, best warranted by the facts we possess, would direct us towards the blood and nervous system generally, as the parts of the animal economy most liable to be thus affected."—*Medical Notes and Reflections, by Henry Holland, M. D., &c. &c.*, p. 498.

who have the same depraved taste, or are so unfortunate as to be thrown into its company. It is the favourite child of 'laissez faire,'—in plain language, 'let alone;' and bears the same relation to filth that crime bears to ignorance."

I think no one will deny the truth of these observations; I have certainly during the major part of a life been an almost daily witness to their fulfilment and veracity; and the painful part of the subject is, that so much is remediable, and so little practised or attended to. Will the influences herein named produce Cholera?—No doubt of it.*

I question very much if in many persons actual "absorption" is requisite to produce its effect. It seems to me that two modes present themselves,—one no doubt absorptive, as in small-pox and many other diseases; the other means may, I believe, prove effective *simply by contact*, as in a great number of instances of chemical results is, we know, the case.†

* Dr. Browne, in his excellent paper on "Cholera," says,—"Malaria has been supposed to be a cause of the disease; and this opinion derives a great degree of probability, from its appearing at the season when autumnal intermittents and remittents prevail, and the fact that many cases of sub-continued or slightly remitting fever, and even of ague, have been observed, which commenced with symptoms identically similar to those of Cholera. A remarkable example of the malarious origin of disease occurred at a school at Clapham in August, 1829. A very bad drain, or cesspool, was opened, and its contents were thrown into a garden adjoining the school. A day or two afterwards, one of the boys was attacked, and in two days more twenty others out of the total of thirty. The disease appears to have considerably resembled the Indian epidemic, the evacuations being much less tinged with bile than is usual in the ordinary Cholera of temperate climates. Two cases terminated fatally. It was held by the highly respectable medical authorities assembled on the occasion, that the effluvia from the putrid matter had produced the disease."—*Cyclopædia of Practical Medicine*, vol. 1, p. 382.

† I think Liebig's opinions on the subject of some destructive agents seem to lead strongly to, and corroborate, this view of the subject; he says, "There is a peculiar class of substances which are generated during

These two modes are called respectively the zymotic* or fermentative, and the catalytic,† the latter implying something which siezes and lays hold of.‡ It may be well to explain generally the ordinary meaning of these two terms. The former, namely, the zymotic or fermentive theory, implies a process and result by which certain substances, on being applied to other bodies or substances, at the same time that they themselves undergo change, cause a plentiful crop of the same, as that so originally applied, to be generated by means of certain formative actions which are set up on the commixture or addition being effected. Thus yeast, on being added to certain fermentive fluids, as beer and many others, will cause the fermentive action, and a crop of yeast is the result; so in certain diseases, as small-pox and many

certain processes of decomposition, and which act upon the animal economy as deadly poisons, not on account of their powers of entering into combination with it, or by reason of their containing a poisonous material, but solely by virtue of their peculiar condition. In order to attain a clear conception of the mode of action of these bodies, it is necessary to call to mind the cause on which we have shewn the phenomena of fermentation, decay, and putrefaction to depend. This cause may be expressed by the following law, long since proposed by La Place and Bertholet, although its truth with respect to *chemical* phenomena has only lately been proved. A molecule set in motion by any power can impart its own motion to another molecule with which it may be in CONTACT. This is a law of dynamics, the operation of which is manifest in all cases in which the resistance *(force, affinity, or cohesion)* opposed to the motion is not sufficient to overcome it."—*Liebig's Chemistry of Agriculture and Physiology*, p. 265, edit. of 1848.

* ζυμη, a ferment. † καταλαμβανω, to seize, to hold.

‡ For instance, in death resulting from the action of the substance called "kakodile" and some others, on being inhaled. It appears to me that this action is too sudden to be attributable to absorption, for it is instantaneous, and probably excites more a catalytic action from contact than any other.—G. G. B.

others, a crop of the like virus is the consequence of inoculation of the system.

It is a curious fact that Hyppocrates recognized and recorded this idea of fermentive action in diseases, and evidently his great mind fully appreciated the resemblance.

The catalytic theory signifies a process, by means of which "a substance excites by and from its mere presence, and without itself undergoing change, as ordinary ferments do, —some chemical action in the substances with which it is in contact. So, for example, spongy platinum, placed in a mixture however voluminous of oxygen and hydrogen, makes them combine to form water; and deastise makes the starch in grains undergo transformation, and sugar is produced." *

I think it worth considering whether a similar catalytic influence is not exerted often in epidemics, *(for I cannot believe such influences are always necessarily exerted in the same manner,)* and it seems to me this view of the subject is pressed on the mind by looking at certain facts, as, for instance, in unhealthy dwellings, damp or ill ventilated rooms or places, and the variety of cesspools, drains, &c., we find Cholera often present itself; now the bad air, the damp, and stenches, were all probably in existence long before, and no result (such as the epidemic in question) made its appearance; but epidemic influence prevailing, this seizes on such atmospheres, and probably, "without undergoing any change in itself," by the catalytic process from simple contact (finding these atmospheres in a state to be acted on), it converts them into Choleric poison, fit and ready to act on any of the predisposed who come within their influence, range, and contact; and so, by a parity of reasoning and induction, I assume, that in *individuals not exposed* to such

* Kirke's Physiology, p. 211.

compounds, but living in healthy places and even in apparent health, there may be some principle or condition either natural, hereditary, or acquired,* which may make their frame and constitution prone to be acted on by such epidemic catalysis, and with the same effects, or equal to the same, as what I maintain probably occurred in the former instance.

Again, intemperance, want of rest, anxiety of mind, fear, bad food, repletion, hunger, and many other causes, or several acting in concert, may bring an individual not otherwise so disposed into this prone condition.

No doubt again, when epidemic disease invades a dwelling, *all those similarly situated are liable to be similarly affected*, as in houses, prisons, ships, warehouses, seminaries, &c.,—*and this not always, but sometimes only, from contagion.*†

The obvious inference is, that we should in such cases get all *if* we can, or all we can, into the condition of body, mind, and circumstance, which will best prove resistile to

* Some individuals only are liable to "hay fever;" others are remarkably prone to take an infective,—"they catch every disease they come near." I have myself seen instances of this.

Dr. Collier says, Op. Cit.—"Again, there are individual and even family temperaments, prone to suffer from epidemic conditions."

† I believe many diseases, not originally contagious, may become so eventually; and others, although they may not have proved contagious in one place, may do so in another; for instance, Mr. Boyle, in speaking of a fever which was not proved contagious at Sierra Leone, says,—"There is good ground for believing, that although the disease was not contagious at Sierra Leone, it did assume that nature on board his Majesty's ship Eden, while on her passage to or at Fernanda Po."—*Boyle, on the Fevers of Africa.*

This, and similar facts, in my opinion, ought to teach us lessons of wary prudence and due caution; such need not, and ought not, to interfere with duty,—but their due exercise may save much calamity.—G. G. B.

epidemic force,—and also, for fear of *what may be*, take prudent precaution to prevent it from spreading by means of contagion.*

I firmly believe in this view of the matter, and hence it impresses me with the necessity for avoiding, whether in public establishments, streets, or communities, all causes which may give rise to such dire predispositions and circumstances; and also it enforces the necessity on individuals to be guarded in their general care of their health, diet, and persons.†

Moreover, I believe this view of the subject, supposing it to be correct, points out how it may be, that epidemic force appears to vary so much at different times or places, or even at different visits, as before remarked on.—See pages 14 and 15. For it is probable at one period the catalytic power of an epidemic may be weak, and lay hold of atmospheres, or persons only that are very prone to receive its influence, or that of epidemics generally; at other visits it may be stronger

* It is in this matter of probable contagion, as it is in dealing with mankind,—for in our transactions, we do not guard against what men certainly *will do*, so much as what *they may* do.

Dr. Collier observes also what I myself have seen amply verified, namely, "In all epidemics, the collecting together of a number of patients under one roof, in community with others intact, increases the force of the contagion, otherwise insignificant, and in the abstract diminishes the chance of recovery. But such increased hazard may be more than counterbalanced by the superior accommodation, and more complete adaptation, of aid insurable in such hospitalization. The same applies to foundling hospitals, lying-in hospitals, Cholera hospitals, and all hospitals."—*Op. Cit.*

† It was, I believe, a consideration of this view of the subject which in a great measure induced the present intelligent Mayor of Swansea to institute, persevere in, and carry out, the excellent sanatory means he adopted, in the hope of in some measure protecting the public health of the borough; and his exertions have hitherto met with signal success.

and have a wider range; and at length it may acquire such a power as will enable it to seize on healthy persons, places, or atmospheres,—or even changes may occur in its nature and character, which will occasion it to select these in preference to such as it usually attacked on former visitations; or even to attack all alike without reference to any usual selections or proclivities, and then to become "pandemic."*

Amongst the causes which I am satisfied dreadfully influence the spread of Cholera, and other epidemic diseases,

* I desire here, in order to guard myself in the reader's mind against the possible idea of having been too sanguine in my views and expressions, as to the efficacy of sanatory measures in preventing epidemics, to observe, that it is certainly not my intention to offer any over-confident predictions, or boastful assertions. I speak of probable effects and of facts, as I have found or known them, and also of the ascertained experience of myself and others; but, after all we can or may do in sanatory cases, and in many other instances, we are to remember that "the ways of Providence are not our ways," and that, excepting so far as is permitted to us, "they are past finding out." Still something is allowed us in the high path of discovery,—enough to encourage us to hope and exert ourselves for the best, in rationally, humbly, industriously, and trustfully, doing all we can to protect our own lives and health and those of others, from sublunary evils of every kind by which we are beset and assailed. This we shall best accomplish by following the legitimate rules of right reason, truth, and duty. I think the more we properly by human means guard against "epidemics," the less liable we shall (humanly speaking) be to suffer from "pandemics;" and it is also my firm belief that Providence helps none more readily than those who, trusting in him, *rightly help themselves*, and do unto others as they would be done by; the latter a rule, even as a duty of self-interest, as a principle of selfishness (letting alone higher and better considerations), by no means to be neglected, during the occurrence of an epidemic like Cholera; for there is no doubt but that in proportion as we duly and faithfully assist our poorer and needing neighbours, so we are administering to our own protection and welfare, and that of our families: it is ever so, for the path of duty is the best and surest road of safety, both for time and eternity.

may here be mentioned *bad house ventilation*, and especially one kind, which I am satisfied does much towards bringing deadly mischief into human dwellings, particularly of the more numerous classes. If we visit populous localities, such as those of iron works, copper works, or other manufacturing communities, and also the smaller description of houses in towns, we shall find often whole rows or streets of dwellings in which there is no thorough draft for ventilation, especially in the upper stories; and in many of these upper rooms there are no fire places,—although if there were, the proximity of these to the floor would render them very inefficient for the purposes of effectual ventilation. On glancing over the whole row at the backs of the houses, it will be seen, that often there is no perforation of the back walls, excepting the back doors, and it may be a small window on the ground floor behind the cottage; the front wall is perforated with windows both in the upper and lower stories, but then the front *door* only is for the most part opened,—the windows being kept most religiously closed even in the hottest days of summer, and indeed oftentimes they are not originally constructed to admit of being opened; and if a pane of glass is perchance broken, this providence is instantly frustrated by filling up the aperture with rags.

At the back of each dwelling, again, and indeed too often in front, we shall often find on inspection a small yard, with a moist floor, full of impurities of various kinds, and the emanations proceeding therefrom; and again in this yard, or in the adjacent garden (if such there chance to be) stands an undrained pig-stye with its occupant, and a foul manure heap close thereto; near at hand, again, is the tub of stinking pigs'-wash; and adjacent to this, an open privy, this sometimes overflowing, and too frequently in a dilapidated and shocking state; again, we probably find an open gutter,

running the whole length of the row or street, in front or behind, or both, and serving the double purpose of receiving the rain drippings from the tiles, and the filth and abominations thrown or running into it continually; this horrid sink, so replete with disease, being the *play place* of the almost infants and of the children, who are ever hovering over its fatal, green, dank sides, with their little faces close to its fatal contents, sailing their tiny boats, or occupied with other innocent sports of happy childhood. Thus, in the joyous unconciousness of that period of life, do these children often stand amidst and sport with danger as great, and disease as fatal, as if they were caressing a speckled viper, and hugging the venemous reptile to their bosoms,—their parents and protectors looking on with as much apathy, indifference, and absence of fear, as if they contemplated their offspring gambolling on beds of violets and roses, and little remembering that they themselves are day and night living within the fatal spring and grasp of Death, thus brought by themselves, and often by the bad arrangements and inconsiderate conduct of their landlords, close to their doors and homesteads.*

* "Do facts exist which prove that the state of transformation, or putrefaction of a substance, is propagated likewise to any parts or constituents of the living body; and that by contact with the putrefying body, a state is induced in these parts, like that in which the particles of the putrefying bodies themselves are? This question must be decidedly answered in the affirmative."—*Liebig's Animal Chemistry*, p. 203.

And again, the same author says at page 205, Op. Cit.:—"Lastly, it is a universal observation, that 'the origin of epidemic disease is often to be traced to the putrefaction of animal and vegetable matters.—[The reader should be aware, that one division of epidemics is into "local" and "migrating."—G. G. B.]—That miasmatic diseases are endemic in places where the decomposition of organic matter is constantly taking place, as in marshy and *moist* localities; that they are developed epidemically, under the same circumstances, after inundations; also in places

This is shocking to contemplate, horrible to witness, harrowing alike to narrate or peruse. It would be natural to suppose, that no one to whom this subject had been laid open in its true light, and who possessed any influence, or owned property of this description, could lie down in his bed, without coming to a wise and pious determination to see such evils remedied. "Visitations of Providence," indeed! say, rather, it is the effect of negligence, apathy, cupidity, and ignorance; retributive justice meeting wilful man in his wilful ways, as it ever was and will be in accordance with the laws of nature, emanating from Divine ordination.

But it is not ever thus; there are brilliant exceptions. Some men, and they of wealth and influence, too, have duly considered these things. I have seen the school-house rear its head, a noble pile, replete with future hope and future advantage, information, and blessings,—blessings like those of mercy, "twice blessed, to him who gives and him who takes." I have witnessed the busy workmen draining rows of cottages, and arching over those viaducts of filth, impurity, and death, and conducting their contents to a place of safety,* with as much care and consideration as if they were bestowing their labour on the stately mansion of their wealthy Christian master. I have seen also, and have known, the effects of all this, and have witnessed the change

where a large number of people are crowded together, with insufficient ventilation, as in ships, prisons, and besieged places.' But we can never so surely predict the arising of epidemic diseases, as where a marshy surface has been dried up by continued heat; or where extensive inundations are followed by intense heat." See also Boyle on African Fevers.

* I have too often observed house sewers drained in the following manner,—that is, they were drained to the extent that the viaducts carried the refuse matter to the vicinity of *another row* of houses, situated lower down on the hill side, and there left it on the open ground.

of health and prospects entailed, in the improved countenances and happy ruddy faces of the children so fortunately situated, for they seemed to speak eloquently of the care bestowed on them, and say "God bless him!"

But then, take the reverse, and for one moment view the weary watchings, the wan looks of care-worn and grief-worn relatives, the sufferings of heavy sickness, perhaps the permanently damaged health, or the death of the victims of these vile sources of catastrophe. I have seen hundreds on hundreds of such instances, where a few pounds well spent, and proper regulations duly enforced, would have stopped all this severe catastrophe and calamity effectually.*

Such causes as I have just reprobated are no doubt greatly enhanced, in point of danger and dire efficacy, by the too frequent visits to the beer shop and tavern, and the excesses there committed,—for whoever personally witnesses such scenes, will confirm the truth of this melancholy fact; indeed it is too true that on Saturdays, Sundays, and Mondays (the two former days being unhappily, in many instances, devoted to inebriety and debauchery), Cholera in such communities commits the greatest ravages amongst the adult population.†

But I will now ask the intelligent reader to contemplate the interior of such cottages as I have been adverting to, in their in-door arrangements. Say the sleeping rooms are twelve feet wide, and of the same length (many are of much smaller dimensions, and some, as I before said, have no fire places); now a room twelve feet long, twelve feet wide,

* For abundant instances of this description, see the Reports of the Sanatory Commission, and the able Reports of Mr. Chadwick.

† This fact cannot be too strongly impressed on the working population by the ministers of religion, and others having influence,—*Drunkenness is one of the most deadly and dangerous predisposing "causes" of Cholera.*

and seven feet high, will contain 1008 cubic feet of atmospheric air; let us suppose this to be closely pent up, in other words, that the room is very ill ventilated, and that two adult persons pass the night in such an apartment (there are oftener a greater number, perhaps four, or five, or six); these two persons, *on breathing pure air* in the course of twelve hours, would consume nearly twenty-two cubic feet of oxygen gas, and give out about nineteen cubic feet of carbonic acid gas.* These facts will readily shew the reader the miserable plight the atmosphere of such an apartment must be in, after so using and re-using the air mixed with the moist respiratory and perspirable matter exhaled by the occupants.† This is fearful to think of; but the truth is, it very seldom is given any thought at all, scarcely does it receive consideration. It is a notorious fact, that navigators and others, when working night and day work, will successively in turns, as the different gangs retire from work, crowd these apartments and beds, without even opening

* "It may be stated as a general average, deduced from the results of experiments of Valentine and Brunner (vol. iv., p. 547), that under ordinary circumstances the quantity of this gas" [*carbonic acid*] "exhaled into the air, breathed by a healthy adult man, amounts to 1345.3 cubic inches, or about 636 grains *per hour*."—*Kirke's Physiology*, p. 158. According to the same author, "the quantity of *oxygen* absorbed in the *same time* (i. e. one hour) is 1583.6 cubic inches, or 541.5 grains.

† An atmosphere containing more than 10 per cent. of carbonic acid gas, would probably be fatal ere long. "Carbonic acid is one of the poisonous gasses which can be taken into the lungs, for it does not excite coughing, even when inspired in large quantity. It has a narcotic action on the system, producing asphyxia without exciting any symptoms of suffocation. *Atmospheric air containing more than ten per cent. of carbonic acid, is quickly fatal.*"—*Muller's Physiology.*

N. B.—"The black hole of Calcutta" afforded a striking instance of the effects of deteriorated air; and it is to be observed, that several of the survivors on this occasion suffered afterwards from *typhus fever*.—G. G. B.

the windows,—so that these rooms are constantly full, and as constantly unventilated.*

* "Mere impurity of the air—by which I mean impurity that does not result from the admixture of any *specific* poison, such as the marsh poison, and the various contagions—is a powerful predisposing cause of disease. The prejudicial effect of impure air is seen, on a large scale, by comparing the inhabitants of great towns, in respect of health and longevity, with those who live in the country. If we again refer to Mr. Farr's calculations, founded upon the returns made to the Registrar General, we find it stated, in the third annual report, that in cities, as contrasted with rural districts, the deaths from consumption are increased 24 per cent.; those from typhus, 55 per cent.; those from childbirth, 59 per cent.; and so of several other disorders. 'The diseases chiefly incidental to childhood are twice as fatal in the town districts as they are in the country.' The mean duration of life in the two classes of districts differs nearly 17 years; being in the proportion of 55 years (country) to 38 years (towns).

"These differences we can explain only by attributing them to the weakening influence of impure air, and the want of sufficient exercise; for, as Dr. Alison has remarked, 'it is hardly possible to observe separately the effect on the animal economy of deficiency of exercise, and deficiency of fresh air, these two causes being generally applied together. But it is perfectly ascertained on an extensive scale, in regard to the inhabitants of large and crowded cities, as compared with the rural population of the same climate, that their mortality is very much greater, especially in early life, and the probability of life very much less.' There is one circumstance which shows that impure air is the more noxious agent of the two, namely, the great comparative mortality, in towns, of children under two years of age, even although they get as much exercise as their time of life would allow of anywhere. The noxious and depressing influence of vitiated air is made strikingly manifest by the effect of removal to a purer atmosphere. We are continually obliged to recommend 'change of air' to our patients. We advise them to go out of London,—'where houses thick and sewers annoy the air,'—that their recovery from acute disorders may be accelerated, and that they may regain the degree of general strength which is necessary to the cure of many chronic complaints; of all those especially that require the use of *tonic* medicines, among which class of remedies no one is so effectual, in constitutions

The ravages of *Cholera*, I need hardly say, are often fearful in such places, particularly when other circumstances combine to add the required sum of effective force to the other causes calculated to produce it. In rows of cottages, situated as I have described, no matter how healthy the localities, and in apartments such as I have described, no matter how pure the external atmosphere, we shall be sure to meet this deadly visitant, Cholera, whenever it is stalking abroad on its errand of death and destruction.*

that have been weakened by a town life, as migration to the clear and pure air of the country.

It is necessary, however, to remember that although impure air has most unquestionably a very hurtful effect upon the general health, there is no specific disease which can be distinctly traced to it as an *exciting* cause. It is as a predisposing influence that the impurity operates—for instance, it never *generates* (as I believe) continued fever, yet it will most certainly aggravate the symptoms, and favour the propagation, and augment the mortality, of that, and of other diseases, in a great degree. If there be any diseased condition that is strictly the product of impure air, it is scrofula. Scrofula (as I shall presently show you) depends in part upon hereditary constitution; it partly arises also from exposure to cold and wet; but there is much reason for believing that impure air is a very powerful agent in calling scrofula into action, and in aggravating the strumous diathesis."—*Lectures on the Principles and Practice of Physic, by Thomas Watson, M.D.*, p. 105.

* I speak practically, and from observation on these points; and I am confirmed in this view by the matured experience, close observation, and practical opportunities of Dr. Sutherland and Mr. Bowie, before alluded to, who (in a conversation I had with them) adverted strongly to these causes, and urged energetically the necessity of obviating such destructive and easily remediable evils.

N. B. I accompanied Mr. Bowie to a row of cottages, in which Cholera had appeared; the location was healthy, on a hill side, the fronts of the houses were well kept, and the interiors were neat and clean; but when we went to the "backs" of the houses, circumstances such as I have described were found in abundance.

I visited, on another occasion, a cottage, in which two fatal cases of

All causes that injuriously affect the pulmonary respiratory system, or the skin, or the digestive organs, predispose to Cholera, and so do those which depress the mind, for thereby they reduce the power of the nervous centres, and diminish resistile power or force. Therefore over crowding, bad air,* foul smells, the vicinity of putrefying matter,† vicissitudes of temperature,‡ bad food,‖ irregularity of diet, paucity of food, intemperance, or mental depression, particularly fear,§ are all great helps to produce Cholera.

Cholera occurred; it was a new dwelling, neat and clean outside and inside, and healthfully situated; but within it was not ventilated, but comparatively almost as close as a hat with a piece of gutta percha glued over the brim and aperture.

In both these instances it had been a matter of surprise "*that Cholera should attack such healthy places;*" but the fact is, they had been *converted into most unhealthy places*, and equally so might a house be on a *mountain top*, where I have seen deadly typhus fevers dozens on dozens of times. And so have I known Cholera to exist in similar places, and, as I believe, from similar or equally obvious causes.

In the case I just alluded to, in connection with "Mr. Bowie," it happened the wind blew along the line of cottages; we went in the wind's current, and immediately recognised the foul "fever smell," most disgustingly proceeding from these gardens, yards, &c.

As regards ventilation, it is easily effected; but strange as it may appear, such is the apathy of the inhabitants, that they will, in my experience, seldom attend to the matter when pointed out. In a whole street, I was unable to get any person to ventilate, cheap as it was, and much as it was required, save one, and he was an old soldier,—i. e. he had been trained, or educated. Ignorance is a direful curse.

The proprietors of works have in some instances insisted on the ventilation of the houses of their workmen, and I have seen the good effects of the measure. It is easily effected by making a hole, either in the roof or back of the house, and inserting a piece of zinc or sheet iron, with holes punched therein.

* Sufficient has already been adduced to prove this.

† The fever which occurred in the neighbourhood of Westminster, about two years ago, was traced to this cause.

[For notes, marked respectively ‡ ‖ §, see following page.]

I must here advert further to one cause of disease of daily occurrence and mischief, I mean open privies; I am convinced they have a large share in predisposing to disease; and I have had frequent opportunities of verifying this fact. Lately, when Cholera broke out in the Swansea Gaol,

‡ Proper clothing ought to be a subject of due consideration; and as regards the effects of temperature, I quote the following from Liebig's Organic Chemistry of Physiology and Pathology, p. 254, which may well serve as a general hint to the aged, and also as to the clothing of the young, and offers caution as to temperature. Liebig observes,—"A child, lightly clothed, can bear cooling by a low external temperature, without injury to health; the force available for mechanical purposes, and the temperature of its body, increase with the change of matter, which follows the cooling; while a high temperature, which impedes the change of matter, is followed by disease. On the other hand, we see, in hospitals and charitable institutions (in Brussels, for example), in which *old people* spend the last years of life, that when the temperature of the dormitory, in winter, sinks two or three degrees below the usual point, by this slight degree of cooling, the death of the oldest and weakest, males as well as females, is brought about. They are found lying tranquilly in bed, without the slightest symptoms of disease, or of the usual recognizable causes of death."—*William Gregory, M. D.'s edition of Animal Chemistry, by Justus Liebig*, p. 255.

‖ "The fact observed by Magendie, that putrefying blood, brain, bile, eggs, &c. laid on recent wounds, cause vomiting, torpitude, and death, after a longer or shorter interval, has never, as yet, been contradicted." —*Liebig's Animal Chemistry*, part 1, p. 203. A reference to Taylor on Poisons, under the head of "poisonous food," will equally shew how the system may be affected through the stomach in these cases. *Bad water* will produce fever; an instance of this went the round of the papers some time ago, where a well at Clifton, near Bristol, communicated with a drain by means of an accidental circumstance, and produced gastric fever in several cases, to those drinking this water.

§ Dr. Marshall Hall remarks, "As a cause of disease, the influence of the more painful and violent emotions is most extraordinary. But no cause of disease is more dire than fright." This same admirable physician and discoverer in science observes, "Despondency is as injurious."—*See Observations on Medicine*, second series, pp. 23 and 24.

there were nine open privies, and some of them were offensive. On a representation to the visiting magistrates, they instantly ordered them to be converted into water-closets;* and the governor and officers of the prison can well testify to the good effect of thus so sealing up these sources of pollution; in the cases of diarrhœa it was remarkable, and Cholera ceased.

It is my opinion, that the result of living near an offensive open privy, is very much akin to living near an open grave; the matter contained is in its elements identical. A considerable portion of the products of all animal and vegetable matter in a state of putrefaction and decay, are sulphuretted hydrogen and hydro sulphuret of ammonia,—two most directly injurious, poisonous, and debilitating gasses, even in small quantities.†

Do emanations from the earth produce epidemics? I think I have already said sufficient to prove that they do so. If further evidence were required, it may be abun-

* Fortunately for the not over wealthy, this desideratum may be now acquired effectually, at a cost of from twenty to thirty shillings. I have had one of this description placed in my own premises, which answers as well as possible. Mr. Arnold, and Mr. Taylor, plumbers, of this town, I know, keep them, and put them up cheaply and well; no doubt many others do the same.

† Dr. Taylor on Poisons, Christison on Poisons, and Beck's Medical Jurisprudence.

I may here observe, that it has been the prevailing opinion that many of the deadly fevers, witnessed in tropical climates, were attributable to the operation of these gasses; but according to Dr. J. B. Williams's enquiry into the matter, it seems this has not been clearly verified. However, that such causes *often* produce fevers and other diseases, we have abundant proof.—*See Dr. Williams's Principles of Medicine*, p. 57.

Dr. Taylor relates a case where some workmen, employed in the Thames Tunnel, got into a stratum of soil, the waters of which gave out sulphuretted hydrogen gas; and the effects were most dire.—*Taylor on Poisons*, p. 811.

dantly found in the numerous records of various authors, many of which I have quoted.* I shall take it for granted my readers are already satisfied on this point, and will only offer one additional support thereof, namely, the opinion of the late Dr. J. Johnson. I have before stated that Dr. Annesley thought that Cholera was not contagious; now Dr. J. Johnson, in reference to this, presents the following

* I have on a former occasion, in a pamphlet I wrote on "Civic Malaria," adverted to some facts of this kind, as the following passage indicates:—

"But perhaps as striking a fact as can well be adduced of the deadly effects of malarious exhalations, will be found in what is called the black fever of Oxford, which happened at an assize, in 1547; these assizes were held in the castle of Oxford, and there seems to be no doubt but that this mortal disease, which was so fatal as to kill the judges, gentry, and most of the people present, to the number of about 300, was caused by malarious influence, the result of a nastily kept and close gaol. Lord Verulam, who lived at this time, has in his 'Sylva Sylvarum,' published in 1620, alluded to the circumstance, and affirms this fever to have been so caused; and Dr. Mead, who, in the year 1720, (at the request of Sir Richard Craggs, then one of the principal Secretaries of State,) wrote a short treatise on the prevention and management of the plague, affirms a similar opinion to that of Lord Verulam, as the result of his inquiries with respect to the cause of the black fever to which I have just alluded.

"It would seem from Dr. Mead's account, that some thought this fever was produced by emanations from the earth; and it is very possible the floors of the gaol may have been kept in that particularly neglected and filthy state which was eminently favourable to the formation of these deadly emanations.

"The sentence in which Lord Bacon speaks of these fevers of the gaol, is a brief one, but it is very remarkable. He says,—'The most pernicious infection, next to the plague, is the smell of the jayl, when prisoners have been long and close, and nastily kept, whereof we have had in our times experience twice or thrice; when both the judges that sat upon the jayl, and numbers of those that attended the business, or were present, sickened upon it, and died. Therefore, it were good wisdom that in such cases the jayl were well aired before they were brought forth.'"—*Op. Cit.*, p. 10.

passage, Op. Cit., p. 298:—"Mr. Annesley observes, it is a well known fact, that 'in the very centre of extensive districts ravaged by epidemic Cholera, there are certain narrow stripes or patches of the country, into which the disease has never penetrated, though all around was one scene of desolation.' This circumstance, he thinks, 'militates most conclusively against any idea of its being a *contagious disease*.' We confess we do not see any necessity for this conclusion; and we venture to predict, that Sir Gilbert Blane will adduce this very circumstance in favour of contagion. At all events, it surely militates as much against any general atmospherical influence. It seems much more to the support of the opinion, which we ourselves have always maintained, THAT EPIDEMIC, AS WELL AS ENDEMIC DISEASES, DEPEND ON EMANATIONS FROM THE EARTH."

The only matter to which I shall further advert, as an occasional probable cause of epidemics, is the parasitic and insect theories,—meaning that there occasionally exist, floating in the atmosphere, certain vegetative matters, or certain dead or living animalcules, to the effect of which epidemical diseases are at times attributable, and that these are borne about by the winds. On this topic, however, I shall not offer any opinion, but rather, in this still doubtful matter, rest on the wise maxim adopted by "Dr. Latham," and recorded by him—viz., "I have no right to be absolutely incredulous about the possibility of things which I have never seen, nor am I."* Amongst those whose writings on this subject are of most interest, so far as I know, are those of Dr. Holland; his paper "on the Hypothesis of Insect Life, as a cause of Disease," is, like his other writings, replete with deep research, forcible argument, and instructive information.

* Latham, on Diseases of the Heart, vol. 2, p. 266.

I think the substance of his observations amounts to this, that he offers no clear or distinct evidence (there being no actual and irresistible demonstration) that such causes *actually do exist;* but it seems to me that he gives abundant ground to justify the belief, that to such causes epidemics *may* occasionally be attributable, and that therefore the subject is open to, and well worthy of, further examination.*

It appears to my mind, and I think the writings of Dr. Williams, Professor Liebig, and Dr. Holland, all appear to point out clearly, that it is principally to the *microscope*† we shall stand indebted for much of our future and further information on the subject of miasma; at present there are

* Dr. Holland adverts to this fact in the following quotation, shewing clearly that discoveries are to be made, and that they have been effected. He says, "It is curious evidence of the progress of such research, that while eleven species only of intestinal worms are recorded in the 12th edition of the Systema Naturæ of Linnæus, nearly 1000 species are described by Rudolfi, in his Entozoorum Synopsis; and others have since been discovered."

† However this may be, the whole subject of parasitic animals and plants, and of the mutual relations of each class, is replete with curious matter of research; and now first pursued with an earnestness proportionate to its importance. It provides us with argument and analogy from every part of organic existence, in attestation of the fact, that the life of one being is, in innumerable cases, supported by the life of another; and that there are express relations of dependence of this kind established throughout creation, scarcely less definite and remarkable than those by which the functions of individual life are carried on; relations which, though often compatible with health, are in numerous instances the cause of those morbid actions and changes which constitute disease.

It is a singular proof of the extent of the fact stated above, that entomologists have ascertained more than forty genera of insects to be infested by parasitic worms (filariæ), and that it is often possible to determine the species of the insect by that of the parasite living upon it.

many difficulties in the way of using this instrument, in investigating aerial animalculæ; but improving science, it is to be hoped, will overcome many of these.

Professor Liebig appears to deny this source of epidemic influence, and has offered evidence in support of his conclusions; but I must say, with every proper and respectful deference to such great authority, that in my humble opinion a sylogistic examination of what he has set forth, will not fully bear him out, to the extent of his having refuted the views of those who hold contrary opinions, or of his having established his own. If Liebig's opinions are irresistibly demonstrative, there would be no use in pursuing this enquiry further,—"ex nilo nihil fit;" if they are not conclusive, then we are encouraged to investigate further. It is with reference to this point solely that I have ventured on the opinion I have just given; and not with a view of setting my humble judgment in array against that of a great man, who knows far more than I do of the question under discussion.

If, on the other hand, as the writings and inquiries of Dr.

I see a recent notice (1837) of a cryptogamic plant growing on the body of the common fly; the converse (if, indeed, it be correctly stated) of the numerous cases in which animals live upon plants, and completing all the possible mutual relations of parasitic growth in animal and vegetable life. The discovery of monades within the bodies of certain of the entozoa, is another circumstance not less worthy of notice. These facts are very interesting in themselves; and further remarkable, as shewing the exactness of modern observation, and the advance it has made into the most minute operations of nature. Ehrenberg has used a bold, but not unjustifiable figure, in speaking of the "*milky way*" of the smallest organisation,"—accessible, we may add, to human research, like that of the heavens, *only through artificial instruments;* but yielding to these, in the one case as in the other, the most marvellous proofs of the infiniteness of creative power.—*Dr. Holland's Medical Notes and Reflections*, pp. 574-5.

Holland and others seem to indicate, there are reasonable grounds for believing, that investigation into this interesting department of science may be attended with enlightenment and advantage; if probabilities, as they appear to infer, really do exist, for entertaining a reasonable hope that important discoveries may be effected in this field of inquiry, then is there good cause for persevering, ardent research.

I will not dwell further on this subject; my object being, in this place, merely to point out to the general reader, a matter among others now engaging the attention of enquirers into epidemic causes. The not yet settled point of "insect causes" of epidemics, seems to my mind well worthy of further consideration.*

As to *the nature, prevention, and treatment of Cholera*, I shall have but little to say in this treatise; the chief object of which is, to call the attention of the educated public generally to those views which, in a sanatory sense, seem important in their nature, objects, and consequences.

The curative means and remedial agents to be employed in this disease, necessarily rest with the medical profession, for the most part; but the duties of prevention, and the means of prevention, I have endeavoured to shew, belong in a great measure to the community at large, to persons in authority, and also to persons out of authority; in short, to every man who has a house over his head, and a family to

* The flights of insects, frequently observed during epidemic seasons, has been a matter of observation, and is also of interest. I had my attention called a few days ago by a woman, near Morriston, to *myriads* of a species of aphis, having the appearance of minute winged ants, which were passing along in clouds through the air. I have never seen any thing to equal the insect blight in some gardens this year. So far as my observations go, I am inclined to think, that in this climate those years which are most favourable to the developement and propagation of insect life, seem unfavourable to human health.—G. G. B.

protect, and to every one who has a duty to perform towards himself and towards his neighbour,—alike to all in exalted and all in humble life. It is, in truth, very apparent, that in this matter every one may do some good; and it is equally evident, how much harm also may be extensively effected, whether by apathy and neglect, or by culpably permitting, or placing, noxious elements of epidemic disease in situations where they can do hurt.*

As to the *nature of Cholera*, the primary question, of course, must be, *what is this disease?*

I have already unhesitatingly offered an opinion, which I have long formed, that it is a disease of the febrile class; and this opinion is by no means new or singular. I think the more we observe this formidable malady, the more clearly will the evidence shew that such is its character.

Like other diseases of the class, there are often, for the most part, longer or shorter periods of "premonitory indisposition;" and in these, if his attention be summoned, the experienced physician can frequently recognise the forthcoming illness, in the aspect of the patient's countenance, and other indications present. The eye is lurid; the colour of the skin is unnatural, and of a peculiar dusky hue, with a flush (not that of health) present on the cheeks; whilst the character of the patient's countenance is altered, and warns him that nature is taking alarm at what is occurring in the constitution and frame. In short, the patient does not look well, and it is perceived by accustomed persons, that the altered state of appearance is similar to that which they have

* It may be observed, that in epidemic seasons all must necessarily be exposed to epidemic influences; and when these are strong, all in some degree are exposed to danger; but the danger is increased, in proportion as the additional causes of danger are augmented, or multiplied, or as the epidemic influence is powerful.

before recognized in other cases, as preceding an attack of malignant Cholera.

Further enquiry generally brings out the fact, that there are other symptoms coexisting, although they may be slight, and which fully correspond with former observation, and with what is visible in the patient's countenance. The appetite is often capricious, the state of the stomach unsatisfactory, the tongue clammy and white, and covered with viscid mucous, and often it is furrowed; the skin feels damp and sticky, or it may communicate a hot, and shrivelled, and dry sensation to the fingers of others, on touching it. The state of the bowels is irregular, the evacuations uncertain, varying, and unsatisfactory; slight diarrhœa has occasionally occurred, sometimes constipation, for some days past; often, again, these two states have alternated for a brief period of time.* Uneasiness is felt about the abdominal organs, and wandering truncal pains, or sense of weight and oppression,

* I do not mean to imply, that a general train of symptoms indicating dyspepsia, or that signs which manifest slight disturbance in primary or secondary digestion, necessarily forebode Cholera, for often it is quite otherwise; at epidemic times, whether from mental or other disturbing causes, perhaps the health of most people suffers in a degree; few are totally exempt from what may be called "epidemic influence."

Men in extensive practice see, at such times, hundreds of cases of slight abdominal disturbance or disorder, which it never entered their heads to suppose, foretold the approach of this formidable visitant; but then it is only by means of personal and practical acquaintance with disease, by observation and inquiry, and by a careful "grouping of symptoms," and calculating on what such indicate, that men in the medical profession are able to appreciate the nature of such symptoms, and their analogies and differences, and compute their value and importance, or what they truly or probably indicate.

As such symptoms cannot be correctly computed, unless their value and character are first ascertained, it is desirable that those whose personal attention is called to such matters by the state of their own individual health, should, in the absence of adequate knowledge on their own

often about the chest and head; weariness and debility are felt,—pains shifting about the back and limbs,—all these symptoms, or several of them, together with the altered countenance, and an unnatural pulse (which is frequently depressed), indicate the probable advent of Asiatic Cholera, especially with the knowledge that such is the "constitu-

part, not trifle with the indications, but obtain competent advice as to self management, and also as to remedies, if required; that is, they should take *precautionary measures* against *probable premonitory signs*, for oftentimes "forthcoming events cast their shadows before;" and no wisdom is better than that of being "wise in time."

I may state my belief in the fact, that most people experience uneasy abdominal sensations, more or less, during Choleraic periods, from the circumstance of their attention being directed to the subject, and to their own feelings. The following will shew the probability of this, and also plainly point out how readily such feelings are excited and kept up in this way. Dr. Holland, in his paper on the "Effects of Mental Attention on Bodily Organs," Op. Cit., after questioning if sufficient attention has been paid to this subject, and adverting to some instances which clearly prove the truth of the original proposition, observes, "A similar direction of consciousness to the region of the stomach, creates in this part a sense of weight, oppression, or other less definite uneasiness." Again, "The symptoms of the dyspeptic patient are doubtless much aggravated, by the constant and earnest direction of the mind to the digestive organs, and the functions going on in them. Feelings of nausea may be produced, or greatly increased, in this way; and are often suddenly relieved, by the attention being diverted to other objects." Again, "Further, the state and action of the bowels, in particular, are much influenced by the same cause. Sensations occur, of which we were not before conscious; and the actions of the lower bowels, in particular, are obviously excited and quickened."—pp. 72-3. Again, at p. 77,—"If immediately after an attack of cramp, the attention be kept fixed on the limb so affected, a tendency will be felt to renewal of the spasm; and sometimes it will actually recur from this continued excitement to the part." Dr. Holland further adds, "It may appear little better than a truism to affirm, that the attention of the mind, directed to any particular part, makes us conscious of the sensations derived from it, more distinct in kind, or augmented in degree."—p. 77, *Op. Cit.*

tion" of the period at the time they are observed, as will be perfectly within the experience of most medical men accustomed to watch for the first indications of this disease. At length, a sense of shivering is probably experienced, or this with alternate flushings, and sensations of heat; dyspeptic feelings become more urgent, insidious *watery diarrhœa*,* and nausea set in; and ere long, these discomforts increase, and the latent and smouldering disease breaks out in its full force and fury; the diarrhœa and sickness become urgent, and the results more characteristic of the dire malady present themselves.

The dejections and vomited matter assume the peculiar character of this disease, and are voluminous,†—the urinary bladder and liver cease to act,—cramps, cold skin, distressed respiration, debility, anxious sunken countenance, failing pulse,—all come on rapidly; the voice begins to fail; the skin puts on the dusky livid appearance of this epidemic; profuse cold sweats often break out; the hands and nails begin to look blue; and the fingers to give the appearance of being shrunken and shrivelled, resembling those of washer-women after having been engaged at their employment for some hours.

Ere long, the mental condition of the patient is altered, and he begins to lose all healthful appreciation of external things; he evidently is getting indifferent to every thing,—even to his own condition, and is incapable of exerting his attention effectually,—as much so, as if he had taken an

* The moment this symptom sets in, it may be inferred with much certainty that Cholera is on the advent, and that the danger brooks no delay.—G. G. B.

† In some of the most fatal cases of Asiatic Cholera, "Cholera sicca," neither vomiting nor purging occur; but in these it will be found, that although they do not pass off, the secretions are abundant, and remain pent up in the alimentary tube.

over dose of tobacco, or laboured under severe sea-sickness; he is being rapidly hurried on to the "prostrative stage" of Cholera,—and ere long the sunken eye-balls, impaired cerebral functions, lost pulse and voice, and other appearances, indicate that he is past all human hope, and dying of the disease.

What a picture of frail humanity, hurried from this world of time to that of eternity! But yesterday, a patient so afflicted seemed full of health and spirits; in an hour, perhaps, his existence will terminate; and in a few brief hours more, his remains will be carried over that threshold, which he had not long crossed, full of healthful hope and vigour, to receive the welcomings of his family circle, and to participate in the comforts of his happy home. Truly did Sydenham observe, that this disease is "APPALLING TO THE BYESTANDERS."

I have briefly described the painful commencement, course, progress, and termination of this disease, as it often occurs; and of such instances have I been frequently cognizant.

It may be asked, what could be done in such a fearful scene? the answer is, *in the latter stages probably nothing that could avail; but yet, most probably, at the first instant of the attack, every thing that was necessary to stop and prevent the fatal progress of the malady, might have been effected.* I deliberately venture to offer my opinion, that in a *vast majority* of cases of Asiatic Cholera, occurring as I have represented,* this view of the subject is correct; at least, such is my experience.

* I say "occurring as I have represented," because the "variations" of the mode of attack are numerous. In some instances, like the "Bengal fever," "ague," or plague," the attack may be sudden and fatal in its indications; people attacked are evidently *death struck* from the first, and may die in a few minutes. I myself saw an instance, in 1832, where Cholera was fatal in two hours.

So far as my observation goes, Cholera is most fatal where its attack is sudden and virulent from the first, or in cases where the *insidious or premonitory signs have been longest permitted to exist without attention.*

I account for this last by believing, that there are constitutions which do not so easily take alarm, as in the case of many; and in these, the previous blood poisoning, and changes in the condition of this fluid, go on to a fearful extent, before the symptoms recognizable as Cholera make their appearance.

There is a vast difference between the latent periods of forthcoming disease, whilst the illness is brewing, as it were, in the frame, and the time when it manifests itself by its characteristic and evident signs; in other words, between the "formative stage," and that of its "developement."*

Again, reverting to the progress of disease in Cholera, let us suppose that in a case such as I have just described, in the midst of all this formidable scene of suffering and danger, medical aid is sought, happily for the patient, in time; and that remedies are successful, in so far as they check the rapid course of the illness, and its urgent symptoms, so that reaction takes place, and there is good hope of eventual recovery.

It is not to be supposed, that the probable danger must cease at this point, *for it is often far otherwise;* the *stage of fever* (of which, that which I have described often is the first evident setting in†) may now be expected to arrive; and

* This appears to me to shew the imperative necessity of paying wary and discreet attention promptly, in seasons of epidemic Cholera, to slight personal indisposition. The experienced and familiar with disease can often perceive forthcoming disease, and check dire results, which the unaccustomed are unable to foresee, appreciate, or remedy.

† I think it probable, that the diarrhœa constitutes an effort of nature to relieve the oppressed system, by expelling by diarrhœa what is nox-

generally it is vehement and virulent, in proportion to the *violence of the preceding stage*, the state of the patient's constitution, and the shock the system has already received in the former period of the illness.*

Unfortunately, in some instances, there is no opportunity given for struggling through the fever stage, which generally sets in with reaction. This chance is occasionally denied, even when the patient has rallied, and all seems going on favourably, for "head symptoms" will in a few hours set in rapidly; that is, the brain becomes congested and loaded, the patient gets "comatose" and insensible, and presently dies of symptoms resembling apoplexy, spite of all means of aid. Of this I have seen several instances, and I believe the blood poison and its altered condition, probably assisted by its acquired thickness of consistence, from loss of its fluid parts,† together with the damaged and weakened state of the constitutional, nervous, and respiratory functions, all tend and combine to produce this sad and fatal result.

Perfect recoveries from Cholera are in some instances rapid, in others the consecutive febrile stage is severe, and often fatal; its type being, for the most part, "adynamic," (meaning the reverse of strength,) and its "complications," particularly those of the head, intense. Other patients, again, undergo protracted convalescence, attended by severe

ious; but that the succumbing vis vitæ is not able to resist antecedent causes, and the damaging and debilitating means of relief set up; so that thus both go on, unrestrained by the sinking vital energies, and people die in the first stages of "Choleric pestilence," or *fever*,—in other words, they die of Cholera.

* This appears to me an additional reason for timely aid, and avoiding loss of time in the premonitory stage of Cholera; for in proportion as the disease is checked in its early stage, so will the attack of febrile disease be probably slight, or not materially felt.

† The blood, according to Liebig, contains about eighty per cent. of watery fluid.

indigestion, in various forms; great debility, distressing nervous symptoms, and other ailments, which often continue long, and are most harrassing. Moreover, in some instances, various degrees of permanent injury to present and future health is the result of Cholera.

Another feature in the disease is, that one attack gives no certain exemption from a future repetition of its invasion; and, for the most part, the recurrence is, for obvious reasons, not likely to be attended by diminished danger; on the contrary, the danger is frequently augmented.

I shall make no lengthened remarks on the "variations" of Cholera, which, as I have already said, are often remarkable, both as to the severity and difference of the symptoms, and their fatal character, or otherwise,—requiring, as may be readily supposed, very modified or different modes of treatment.*

Having already stated that Cholera is a disease of the fever class, I proceed to give some general reasons for entertaining this belief. In the first place, Cholera is found in the same localities, under the same circumstances, and is produced (or at least greatly influenced) by the same known causes, as those which bring about or influence other fevers and febrile epidemics, whether local or migrating.† Its

* "And here, I cannot help stating it as my decided conviction, that *the ever-varying causes of epidemic diseases will produce an ever-varying character in them, and, consequently, an ever-varying pathology and treatment.*"—*Mr. Jameson's Report on the Epidemic Cholera Morbus.* See Dr. James Johnson on the Diseases of Tropical Climates, p. 289.

† "There can be little doubt, that there are different kinds of malaria, besides that which causes remittent and intermittent fever. Thus yellow fever and plague are endemic diseases, probably arising from aerial poisons. The propagation and mortality of the latter, *perhaps its very existence, is very much to be ascribed to the filth and impurities of the towns where it prevails.*—*Dr. Williams's Principles of Medicine.*

N. B. I have only this day become possessed of the Report of the

tendencies to produce convertibility of disease are similar; for instance, if the "constitutio anni," (i. e., in its free translation, the constitution of the year or season, or period of time,) be typhoid, we know illnesses will be induced to put on a typhoid character in their course and progress. This is the case with small-pox, measles, scarlet fever, and others. If epidemic Cholera is the visitant, this epidemic influence gives these same "converting" tendencies to diseases occurring within its range and power.

It is the character of fevers to cause disturbance and remarkably induce disorders in some of the vital portions of the human frame, and also to produce congestion and its consequences in the soft organs of the abdomen, chest, and head; this they do in accordance with the pathological laws incident to each disease, and modified by the states of the constitution of those attacked.* Through the observation of the operation of these laws, and the consequent symptoms and results, particular diseases are recognized and distinguished by those who make human bodily ailments their study.

The general causes which at different times, under different circumstances, or in different epidemic conditions and seasons, produce very different diseases, often appear in the present state of our knowledge to be the same; but yet the morbid states and the diseases induced at different times, often present very different phenomena; for instance, com-

General Board of Health, dated July, 1849, *a most important document.* It will here be seen, on the testimony of Dr. Sutherland and others, how fearfully similar causes have influenced the mortality and frequency of Cholera. Sept. 1, 1849.—G. G. B.

* For instance, it is the law of small-pox to determine to the skin, in the form of its peculiar eruption; and so, in like manner, other diseases present peculiar indications, according to the pathological laws which influence and determine their character.

mon gastric fever is very different from true typhus, and this last not the same as Cholera, yet they may all be traced often to the same causes, and they are all fevers, and all characterised by blood poisons, or alterations in that fluid.

It seems no more wonderful to me that it should be the *law* of "Choleric pestilence," or fever, to determine the watery parts of the blood to the alimentary tube in large quantities, than it is the province of hæma gastric fevers to conduct a large flow of the general constituents of the same unhealthy circulating fluid to the same channel; or that small-pox should determine to the skin; or that influenza should affect the respiratory organs; or that ague should effect violent congestions of the liver and spleen; or that the causes of bilious diarrhœa or bilious Cholera (sometimes epidemic) should induce a large secretion of unhealthy and irritating bile; or, further, that certain pathological states of the intestines, constituting "tubular diarrhœa," should be attended by large secretions of plastic lymph, which take on and retain the form of that part of the intestinal canal in which it is secreted, and be at length expelled in the form of a cast or mould, so that to the common observer it would seem as if a part of the bowel itself had come away. I say no one of these facts or phenomena appears to me more wonderful than are the rest; but if I were asked, how these differences were brought about, or on what causes intrinsically they depended, I must, in the present state of our knowledge, or at least of my own, be contented to answer, the subject appears to be beyond the power of human penetration.*

* It is thus with many other well known natural phenomena, for instance, we continually, in adopting chemical language, speak of the "behaviour" of certain substances, meaning to point out, how or in what manner they are known or ascertained to act in particular or under

In proof of what I have advanced as to the febrile nature of Cholera, having already briefly quoted one able author, Dr. Billing, (see page 29, note *,) I will here add, that Dr. Parks (certainly, in my judgment, one of the most important writers on Cholera) observes,—"It belongs to the most marked order of epidemic diseases." And again,—"There is little doubt but that it 'nosologically'* belongs to the same order of diseases as small-pox and typhus."†

Speaking from my own personal experience, in those cases of severe Cholera where patients have recovered from the urgent symptoms of collapse, there were few who did not present afterwards the phenomena of adynamic fever, and in this stage I lost many of my patients.

I now proceed to offer some general observations *on the prevention of Cholera.*

I have already affirmed, that *occasionally* this disease is communicable from individual to individual. In addition to the reasons I have formerly given for this opinion, I will quote an extract I have recently perused in the "Lancet," a medical periodical of the greatest importance, and one, to say the least of it, which records fully as much of the practical and scientific information of the medical profession as any journal in the world. The Editor, with the knowledge

varying circumstances, and in different quantities, or with different combinations, or to declare in what their known properties or powers consist; but, *why* they should have been invested with such properties, or have had certain powers or tendences originally assigned them, we are often unable to explain; and this is the state of the case in many pathological instances, equally as it is with many "chemical phenomena."—G. G. B.

* νοσος, a disease, and λογος, a discourse; "applied to that division of medical science which considers the most appropriate names of diseases, and their methodical arrangements and classification."

† Original Reports, part 3d.

of what is going on continually before his eyes, observes, in vol. ii. for 1849, No. 9, and page 202, in answer to a correspondent's enquiry as to the contagious nature of Cholera,—"The question is difficult to answer satisfactorily. The theory of non-contagion has been somewhat shaken by circumstances which have occurred in the present epidemic of Cholera. There can be no doubt but that the disease is, *under certain aggravating circumstances, and to a certain extent*, contagious; but we believe there are no facts which would lead us to assert it is by any means eminently so." As far as my experience enables me to give an opinion, I believe these remarks to be perfectly correct. This view involves two important practical considerations—viz., that ordinarily there is no great danger from contagion; and in the next place, that, with the knowledge and belief that it may be contagious, we should be careful to *abrogate all these "aggravating circumstances"* which tend to give the disease this dangerous character. To this end, I think it of the utmost importance to *avoid crowding dwellings.* I believe this is one of the most fearful causes which are calculated to render the disease communicable. "The house of refuge system," by whomever first suggested, appears to me one of the most important means of preventing the spreading of Cholera, in the crowded domiciles of the poor.

Ventilating dwellings is, again, of high importance. The effects of impure air have already been spoken of; and it cannot be too well remembered, that breathing such air is not only injurious, but is, in its effects, most *insidious* in undermining the health;—to use a common every-day phrase, "it cuts the ground from under a man before he is aware of it," and renders him the ready victim to all causes and sorts of diseases.

Personal cleanliness, again, is a most important preservative to general health. It is extraordinary to what an extent this is neglected, and fearful, too, are the effects of this unseemly and degrading habit of personal and domiciliary want of cleanliness and attention. Well has it been said by an author often quoted in this work, namely, Dr. J. B. Williams,—"Yet, with strange disregard to all instinctive feelings, and indolent neglect of the plainest dictates of reason, human beings are found continually exposing themselves to the influence of their own accumulated filth, until disease is engendered and aggravated into a pestilence, and the rate of mortality is doubled or tripled in the population."*

Neglect of cleanliness, imperfect ventilation, the overcrowding of dwellings, bad water, open privies and cesspools and the like, imperfect drainage, intemperance, bad food, paucity or excess of the same, and excessive personal fear, all individually or combined, in a great measure act in the same way, and tend to produce the same dire results. They also tend to generate in diseased states of the frame animal poisons, and thus to render many diseases contagious which, but for these, would have been innocuous in this respect.

Dr. Holland has written a paper, entitled, "On Points where a Patient may Judge for Himself." It is a valuable paper, and contains excellent ideas. I would observe, there are points *where the public may judge for themselves;* and some of these points, of an important kind, I have endeavoured to bring before the notice of my readers. Pursuing this object, I will advert to *going to funerals* as one cause often of bringing home Cholera from "*the burying.*" I be-

* I think the wash-house system and public baths need greater public attention than they have hitherto abtained, as a great means of ameliorating the sanatory condition "of the poor."—G. G. B.

lieve the too frequent indiscriminate practice and permission, on the parts of heads of families, in either going to, or allowing their children, servants, and others, to attend such places, *highly dangerous.* I know several instances where people living in uninfected places have done this, and the consequence was, that, soon after their return from the fatal neighbourhood they visited, they themselves were attacked by the disease, and died. But this is not the worst part of the business; the disease has sometimes spread in the family, and several additional victims were in this way added to the fatal category.

As regards the use of disinfectants as a preventive. In my judgment they are useful—particularly in decomposing the destructive and offensive effluvia from drains and such places; they are also useful often, I believe, in decomposing the "fomites" of disease, and animal poisons.

I have before adverted to a fact of this kind which occurred at Belfast.—See page 16. I also well remember the late Mr. Abernethy used to relate an instance of the effects of chlorine on vaccine lymph. Exposure, he said, of this animal virus to the action of the gas rendered the virus inert. Important, however, as such disinfectants may be considered, the natural disinfectants, comprised in cleanliness, good ventilation, and sun-light, are far more so. *There are no disinfectants more easily accessible and salutary in their application and results.*

In ships and public establishments, such as poor-houses, prisons, and educational edifices, not only the ventilation, clothing, and cleanliness of the inmates, are of great importance, but their diet is equally so. In the note which I shall here append, being an extract from Dr. Blundell's masterly treatise on obstetrics, the author is particularly adverting to the effects of loss of blood and debility on the

circulating system; but the details are so germane to the point under discussion, that I shall offer them to the reader's consideration.* The blood is in no cases more likely

* "The essay of Dr. Kelly, which describes the appearances discovered in dissecting animals bled to death, is well known. It proves that when the general circulation has been drained to death, the vessels of the brain are still full of blood. But a far more instructive experiment was made a few years ago, at the Penitentiary at Millbank,—of course with no evil intention, and no suspicion of danger,—not on sheep or dogs, but on men and women. The Penitentiary stands on a spot made for the production of malaria,—a swamp below the level of the river, which runs within a hundred yards of the prison. The prisoners were,—with what object and for what reason does not appear,—suddenly put upon a diet from which animal food was almost entirely excluded. An ox's head, which weighed about eight pounds, was made into pea-soup for one hundred people, which allows an ounce and-a-quarter of meat to each person. After they had been living on this food for some time, they lost their colour, flesh, and strength; and could not do as much work as formerly. The men could not grind as much corn, or pump as much water, as they once could; and the women fainted at their work in the laundry. At length, this simple debility of constitution was succeeded by various forms of disease;—they had scurvy, dysentery, diarrhœa, low fever, and (lastly) affections of the brain and nervous system. To show the causes and nature of these diseases, it is necessary only to mention the striking fact, that while the prisoners who fed on this diet were growing weak and falling into disease, the officers of the prison, with their families and servants,—who resided on the same spot, but lived well,—entirely escaped; and the still more striking fact, that about twenty of the prisoners, who were employed in the kitchen, and had an ample supply of meat and other food, with two or three exceptions, continued healthy. The affections of the brain and nervous system, which came on during this faded, wasted, weakened state of body, were head-ache, vertigo, delirium, convulsions, apoplexy, and even mania. When bleeding was tried, the patients fainted after losing five, four, or even fewer ounces of blood; and were not better, but perhaps worse. Leeches to the temples were equally useless. In some cases, these patients died very slowly, after the circulation had remained for a day or two, almost though not quite extinct; yet, on examining their bodies after death, there was found

to be damaged than by bad food, or by the want of food; it matters little whether blood is abstracted from the system, or the proper elements for its formation are denied. A man dies with equal certainty whether you cut his throat effectually, or starve him to death; and next door to the latter, I fear, are many reduced by the inconsiderate and ill-regulated dietary of many public establishments even in the present day. It is not only the quantity of food, but its kind, nature, and quality, that tend to sustain the frame, and support animal heat and health. Unless the elements adequate to all this are judiciously administered, the effects will be disease and broken stamina, and sooner or later even the *pecuniary* burthen, although perhaps in another form, falls on the public purse. It matters little whether the impost be *parochial*, or of another kind.

I have in the preceding pages, for the most part, been endeavouring to show, so far as they are known, what are the means which influence Cholera and other epidemics, whether in promotion or prevention, and little now remains excepting briefly to offer a few general observations on the curative means of Cholera. This I shall do briefly, for it is not my intention to assume the Quixotic task of essaying to inform the general public, what remedies *they* may adopt for such a desirable purpose. The question is beset with difficulties on all sides,—difficulties severely felt by the *medical profession*. I will, however, offer a few remarks on the general bearing and tendency of this part of the question, so far as appearing to me of general interest.

On the curative agents of Cholera and choleric diarrhœa, and the means to be adopted in reference to either or both.

It must be perfectly axiomic, that when a remedy is sug-

increased vascularity of the brain, and sometimes fluid between its membranes, and in its ventricles."—*Principles and Practice of Obstetric Medicine, by James Blundell, M.D.*, p. 584.

gested for any disease with hopeful prospect of success, the presumption must be entertained that such disease is curable. Now many cases of Cholera, from the moment they are seen by medical men, are known to be of an utterly hopeless nature, and in these, of course, it is useless to talk of effectual remedies. An important question, however, is, *why* it happens that many of these become so utterly hopeless and incurable, and whether anything can be done to lessen the number of such melancholy cases?

With reference to the latter point, I have endeavoured to shew that much may be done; and it is with this view of the subject that the public are mainly concerned. Herein the intelligent, the educated, and influential may perform essential benefit to their fellow creatures; herein, by the use of means within their power, magistrates, members of sanatory boards, and boards of guardians, masters of works, and owners of property, and heads of families, and the charitably disposed, may actively and worthily employ their ability and energy. The points to which I would advert as being most worthy of their consideration are briefly as follows:—

Arrangements to prevent over crowding of houses; effective ventilation; an adequate supply of good water *near at hand;* the removal and prevention of the deposit of putrefying animal and vegetable matter; the separation of the sick when illness occurs, by removing from the locality of the active epidemic (whenever it can be effected) all persons, excepting those whose presence is necessary; encouraging personal and domiciliary cleanliness; inducing temperance; inquiry into the circumstances and dietary of the poor, with a view to relief if required; the establishment of regular house visiting, with the object of vigilant scrutiny, so that indisposition may be detected and administered to at

the *earliest possible period;* and placing medical assistance, with remedial agents, nurses, and other requisites, as readily as possible within the reach of those who may need gratuitous aid.

Such regulations, well carried out, will wonderfully diminish suffering and calamity, and will be sure to effect a saving of parochial taxes, much greater in amount than the cost of such sanatary efforts. Under any circumstances, when Cholera is actively present in a district, much fatal sickness is inevitably to be expected; but looking how ill prepared with the means of protection and aid many of the community are, *the wonder is,* that so few, comparatively, are fatally attacked; the wonder is enhanced, when there are taken into the account the drunkenness, fear, utter want of discretion, obstinate neglect of advice, and of timely assistance, together with other unfortunate helps to the spreading of disease, which are so universally rife amongst the more numerous grades of society. I believe nothing short of legal enactment,* wisely framed, and temperately but firmly enforced, will remedy many of these evils, or gradually bring about better habits. I would, however, here express my great satisfaction, that of late years the Government has appeared equally as anxious to frame laws, the effects of which shall be to teach the people their duties, and the *reasons* for performing them, and to enlighten generally the minds of those who are willing to learn, as it has been to construct enactments to punish offenders.

To teach wisdom, seems to my mind fully as necessary

* There is a vile practice in force occasionally, where house proprietors will not allow of open windows in cottage tenants' houses, on account of *the additional risk of the glass being broken.* I have known personally such flagitious instances; and this execrable construction of dwelling-house windows ought, in my opinion, to be made illegal.

and desirable, as it is to chastise the faulty; and "charity," which begins at home, and does not end there, often by kindness and good deeds, and good example, I believe effects as much advantage, and secures as large an amount of human happiness, as does retributive justice,—who, in her inflexible march, overtakes the guilty of mankind. Ignorance and prejudice, I well know (for I have seen much of the poor), are some of the greatest hindrances to sanatory improvement they have to contend with; and an education which would cure these evils, would, I am sure, lead them to discern and pursue their true interests, far more effectually than penal statutes. These last, however, are *obviously* not to be dispensed with, as experience abundantly testifies, especially in bearing testimony, that the "enlightened" and better educated owner of property is often as culpable in neglecting, and fully as unwilling to do his part in promoting, sanatory measures, as are the poor and uninformed tenants and occupiers of humble dwellings. It is melancholy to reflect, that whilst worldy property is hedged around with laws of all kinds for its security, the poor, whose wealth chiefly consists in good health and bodily strength, are too often utterly regardless of both, and view with distrust and thanklessness, any enactments for the better safety of these inestimable blessings. Can any one doubt, that this stupid obduracy *arises, in a great measure, from the want of knowing better?* I am certain it does; I daily see the men who would cheerfully fight to the death for the protection of their wives and children, were it needed, or who would strain sinew and bone to the last fibre to bring them sustenance and shelter, look with perfect indifference on the obvious causes of death and disease, with which their homesteads are filled, or by which they are surrounded. Why is this?—because they are ignorant of the nature and effects of these things, or because

habit has inured them to their existence and presence. In either case, they are blind to the truth,—so that it is next to impossible to induce them to act in accordance with its dictates. It is quite as easy to suppose, a man may be incorrigibly accustomed to filth and dirt, as that he should be inured to crime and debauchery. Often, too, *in both* alike, if he is roused for a time to "repentance" and better conduct, he is apt to fall back in his old ways; such is the power of *habit*. Whilst, then, we coerce the stupid and wilful of the present, we ought to educate the rising generation, train them to knowledge, teach them the ways of wisdom, caution them against bad example, save them from forming bad habits, cause them to see the results of wrong and wicked doing, on the one hand, and the benefits of a virtuous character and good conduct on the other. I believe it is not far from the truth, that "cleanliness is next to godliness;"* the benefits of both, in their respective applications, are inestimable.

I have already said, I am not essaying to point out to the general public, how Cholera is to be cured; *I am only endeavouring to advocate such remedial measures as attach to the general question, and the general community, so far as I know them, and to give my reasons for so doing.* To many, it might perhaps be more acceptable, that I should have gone into the question of therapeutics, or remedial medicinal agents; but I think this would have been wrong,—for to suppose that any persons, save the effectually trained and experienced, can rightly select such remedies, or deal with formidable disease, would be an egregious fallacy; and

* If this be, as I am inclined to think, true, then the clergy and ministers of religion, never backwards in *her* cause, may well advocate the claims of the *sister virtue*, and those of health and human life and happiness, as connected with *her* dictates.

to assume the contrary, by giving curative directions, would only be leading such as were weak enough to confide in them, or act on them, to "imagine a vain thing," probably to their hurt and sorrow. True it is, I see daily advertisements, from which a man would infer, nothing was more easy than to cure the Cholera, and that the writers were possessed of this valuable secret. Many of these announcements proceed from the unprincipled and worthless, to whom personal gain is a sole consideration; and I never see the detestable pretensions of such persons vaunted forth so shamelessly, that I do not think of the wise old adage, which bids us "beware of an ox before, of an ass behind, and of a knave on all sides." To put faith in nostrums and nostrum-mongers in the hour of dangerous sickness, requiring patient skill, experience, and watchfulness, seems to me about as wise as it would be, in crossing a rapid river, to select deliberately a single plank, rather than a sound boat, for the perilous voyage: the danger is obvious; the experience of mankind has proven the fallacy of such a course. The danger is two-fold,—a wrong and hurtful remedy may be selected, which will certainly do hurt; or a remedy may be chosen, not directly hurtful, still by its use, instead of the proper means, the precious time and opportunity for effectual aid may have passed by. What man of matured age and experience in the medical profession has not seen these evils, dozens of times over, and lamented their consequences? I am sure there have been abundant instances, in Choleric attacks, wherein the selection and *perseverance* for hours in wrong remedies, have, to the best of my belief, brought about fatal results, which might, by better judgment and action, have been prevented.

The reader may now ask naturally, "are we, then, in cases of Cholera, to do nothing,—but stand by coolly, with our

hands in our pockets, perhaps for hours, until we can find a doctor?" It will be seen, on reflection, I have argued nothing of the kind; I should myself act, I think, very differently, and would advise others to do the same. I have already suggested the importance of visitors, medical advice, and medicines, and medical men, being all rendered as easy of access as possible. Yet there are cases, where, with the best arrangements, neither can be had on the instant; and are we, then, to wait and do nothing? The clear reply of *common sense* is, "*certainly not;* if you can do no better, you must perforce do nothing; if you can do better, do it, and do it quickly; but take heed and think rationally what you are about, and do nothing without consulting common sense, —not a bad adviser oftentimes,—and endeavour to give yourself a good reason for any thing you put in force." I will give an instance of what I mean:—A gentleman, residing in the country, was a few weeks since roused in the night, by information that two of his women servants had the Cholera; and on further enquiry, he found that both had been attacked, as he believed (correctly), with Choleric vomiting and diarrhœa. He instantly despatched a servant to require my attendance; but he did not stop here,—for, on my arrival, he told me to the effect, that these parties were *extremely* alarmed, and *half dead* with fright; and not knowing what better to do, he had given a dose of laudanum and some brandy to each; and had (to use his own words) "done it effectually, with a view to rouse them, and keep them up until assistance could be obtained." Both these patients, when I saw them, were better, and did perfectly well; and as to *fear*, the effects of the *remedies had entirely caused that to vanish.* The brandy had, no doubt, thus been serviceable; so had the laudanum, given as it had been on the instant to quiet the action of the bowels, and

rouse the failing nervous energies. Brandy is often injurious, yet, given as it was then at the outset to a frightened sinking person, as I have also myself frequently given it, it has oft times a good result. I am very sure this party would have given no such thing to his children,* in any case where fair ordinary reasons and considerations, and the dictates of common sense suggested another course; and I mention this, as an instance of following rightly the dictates of common sense, reason, and experience, in the absence of technical or professional guidance.

I have good reason to believe, the indiscriminate use of brandy in Choleric epidemic seasons, both in sickness and ordinary daily use, has proven very hurtful, and tended to increase the evils it was either hoped or alleged it would tend to relieve or avert. I remember, in 1832, a respectable man asked me, "if I did not think a little brandy and water as a beverage, during the prevalence of Cholera, healthful?" and my reply was, "yes, in moderation, it is as good as any other, where it agrees." On this he rejoined, "Well, I am glad of that, for I have taken a glass every *four hours* for the last fortnight." Of course I need not state, that such reckless conduct is by no means to be imitated.

In instances where Cholera and diarrhœa occur, and medical advice is not at hand, I think it were well, if people, before they took any steps, asked several cogent questions—viz., such as—what appears to be the matter, and under what circumstances,—what is required to be done,—and how this is most likely to be effected, so far as it comes within the scope of obtainable aid, of whatever kind? Clear

* I have seen much mischief from giving brandy indiscriminately to children, in Choleric attacks. Their constitutions are very excitable, and it brings on febrile and nervous disturbance rapidly, in accordance with a general rule, that "action and reaction are contrary and equal."

common sense ideas lead, if rightly followed, to plain common sense conduct: for instance, the child of a friend of mine had taken some improper food, and soon after this he began to have active *diarrhœa*, pain in the head, cold skin, and nausea. His parents, very naturally, inferred the stomach was originally at fault, and the improper food the cause, and instead of resorting to chalk mixtures, laudanum, or brandy, they gave an emetic. The result was effectual, —the diarrhœa, and all other symptoms, quickly subsided. I have little doubt, if neglected, or treated improperly, this child would have had Cholera. One visit was all I found it necessary to pay.

Emetics have, I think, been too little considered in some instances of Choleric diarrhœa. Their action is, when opportunely and properly administered, often of great use.—*See Dr. Holland, Op. Cit.*, p. 304, *and Dr. James Johnson, Op. Cit.*, p. 303.

I have spoken of the state of mind, as greatly influencing the frame, and of the importance of this in epidemic seasons; and I may add, that change of air frequently proves serviceable, and also that, no doubt, such change often exercises great power over the mental state of individuals.

During the epidemic season of 1832, a friend of mine was attacked severely with "Choleric diarrhœa;" it had weakened him in a few hours considerably, and his despondency was extreme; he addressed me earnestly on the improbability of his recovering, with which he was thoroughly impressed, and fairly gave himself up as a dying man; he had heard and seen much of what had been going on in the district during that fatal period; and, no doubt, deep anxiety and painful excitement and apprehension, had reduced his mental powers considerably. It occurred to me, my best chance of being useful, would be to get him away at once

into a healthy place, where there was no Cholera, and where he would hear little or nothing of it; and, accordingly, I ordered a conveyance to the door, and after having administered what remedies I thought proper, I informed him calmly that I had seen cases worse than his do perfectly well on being removed to uninfected places, out of the reach of the epidemic, and asserted confidently that an equally beneficial result would accrue from his leaving home. He protested vehemently against the folly and madness of removing a dying man from his own house, and refused to go; however, the sequel was, that after some pains I partly persuaded and partly forced him to get up and try the experiment, which he did. By the next morning his diarrhœa had left him, his mind was perfectly calm and tranquil, and he informed me he had not been an hour in the fresh country breezes before he felt their calmative and beneficial effects, and he did perfectly well. I have little doubt but that he would have fallen a sacrifice to Cholera, had not these means been taken.*

It would be well if the public generally considered the dangerous consequences of *direct personal fatigue*, as a predisposing cause of Cholera. I think many workmen and others fell victims to the epidemic from this cause, particularly when, after much over exertion, they add the predisposing circumstance of "drinking freely," in order to sustain their exhausted frames. I think employers of

* I have frequently, during the present and past epidemic season, experienced the greatest benefit and rapid improvement from change of air, in cases of what may be termed "epidemic indigestion," and which seemed to resist all remedies I could suggest for their removal. Change of air and scene in each of these seemed immediately to affect the threatening symptoms, on which medicines exerted no effectual and permanent good. I may add, that in one kind of *diarrhœa*, to which puerperal women are liable, change of air is the only known remedy.—G. G. B.

workmen and the workmen themselves would do well to turn their attention more to this circumstance, which seems to my mind *one of vital and practical importance.*

The indiscriminate use of *purgative medicines* is also a fearful evil; I have seen several severe cases of Cholera occur from this imprudent practice, and persons cannot be too wary of the dangerous practice, no less irrational than imprudent and perilous.

It may be well here to advert to the *various modes of treatment* discussed and adopted. We hear of nostrums—of large doses of calomel, at long intervals; of small doses, at frequent times administered; of opium, of astringents, of emetics, of bleeding, of applying cold, of applying heat, of stimulants, of cold water drank freely, of ice given freely, of hydropathy, of saline injections and medicines and treatment, and many others too numerous to mention. All this seems contradictory enough, but it proves one thing, that great doubt and difficulty as yet attend the treatment of Cholera.*

* Seeming inconsistencies are often, when examined, not really of this character; as for example, "*Heat and cold, though so contradictory, apparently in their nature, have similar remedial effects;* and another singularity is, that, with this agreement between their respective agencies, they not only, severally, have a different operation according to the manner in which they are used, (like other powerful remedies, of which antimony and mercury may be adduced as examples,) but both may be made to produce directly opposite effects. Each may be made to exert a stimulant, and each a depressive or lowering action; and much of the error that has prevailed in the use of these measures, has arisen from this double agency not having been always understood."—*Dr. James Arnott on Indigestion*, p. 9. Again, the following trite passage will show how readily, often times *seemingly* contradictory, circumstances may be divested of this, at first sight, apparent character, and rendered perfectly intelligible and satisfactory when they have been duly investigated, perfectly understood, and properly explained:—"To beginners,

How striking is the following passage, from the works of one of the great medical philosophers of the day, a man of well ascertained first-rate powers of mind, and well matured research, experience, and judgment. Dr. Marshall Hall, in his work on the Principles of Medicine (date, 1837), p. 283, observes, "I do not venture to give an opinion upon the treatment of Indian Cholera; but I incline to recommend doses of the hydrargyri submuriatis "every half hour."

Much of the moderate stock of information I possess, and the *whole* of some of it, to me most valuable, I have derived from the discoveries and writings of the author just mentioned; I therefore attach great weight to his assertions, and I think he is not an individual to express a doubt without good reason, or to experience a difficulty unless it really exists at the time in an insuperable form; the mere fact of such a man hesitating to express an opinion, is sufficiently indicative of the uncertainty which at present surrounds the point in question; however, as to the calomel frequently administered, I think I can safely bear testimony, from my humble experience, of its efficacy; and this passage it was that first impressed the plan on my mind.*

With reference to the various modes of treatment I have

the treatment of inflammation *in different ways* must appear contradictory,—even to practitioners of experience it is sometimes difficult; but it will be found rational and consistent by those who have a clear conception of the *modus operandi* of medicines, and by a reference to the various states, both of the parts and of the constitution, which exists under the name of inflammation."—*Billing's First Principles of Medicine*, p. 112. A similar course of reasoning, it must be obvious, may be expected equally to apply to the treatment of many other diseases.—G. G. B.

* I am perfectly cognizant of the fact, that Dr. Ayre has suggested a somewhat similar mode of treatment to that recommended by Dr. M. Hall; and that, in accordance with his views, it is frequently put in practice.

just enumerated, I feel little hesitation in saying (in the present state of our knowledge), that, under various circumstances, and on appropriate occasions, most of them may be selected with probable advantage.* We may hereafter ar-

* I have before adverted to the singular differences which attend the symptoms and state of patients attacked by Cholera, even in short intervals of time, in the same place, or in localities not far apart; there is also, I believe, a more *permanent* change occasionally observable in whole classes of diseases,—a change going on and continuing *for years*. I have clearly recognised a *remarkable* alteration of this kind in certain inflammatory diseases, which seem not to require, nor oftentimes will they bear, the same active depletory means, as they did fifteen or sixteen years ago; and I am not singular in my observation of this fact, for several of my professional friends, now in matured life, have corroborated my opinion in this matter. In confirmation of it, I may adduce the following passage from Dr. Watson's work on the "Practice of Medicine," vol. ii., page 368:—Speaking of puerperal peritonitis, he says,—"Of all the means we possess of arresting this malady, bleeding, general or topical, is, in Dr. Fergusson's opinion, by far the most extensively applicable. But," he adds, "while I admit this, *I am equally certain that large bleeding has not been borne in this complaint, generally speaking, for the last twelve years.*" This, Dr. Watson declares, in the next paragraph, to be an "important truth."

With respect to the difference in the type and intensity of Cholera, and also to the fatal tendency of the disease, despite of care and remedies, the following remarkable facts came under my observation in the year 1832:—At the precise period I speak of Cholera was most dire and fatal at Swansea; the disease seemed to baffle all known remedies; and in the midst of the perplexity and anxiety I felt at the circumstance, I received a note from my esteemed and excellent friend the late Mr. W. Llewellyn, of Taibach, at which place Cholera was then also present: his communication was to the effect of recommending to my attention the "saline treatment" of Cholera, which, he assured me, was most efficacious, and might be considered an antidote for Cholera, as he cured thereby all his patients. In reply, I informed him, I was sorry to say such remedies had proved entirely useless in my hands; and I accounted for it by supposing the type of the disease was less malignant at Taibach than at Swansea. In a day or two after this, my kind friend, who was

rive at some more definite and more generally successful remedies, and knowledge of treatment, than we at present possess.

much my senior, with his well-known zeal and promptitude, rode over to Swansea, as he said, "to see what I was about, and get the thing properly explained." The result of this interview was by no means satisfactory to him, and he left me, unquestionably perfectly convinced I was somehow in error. In about nine days afterwards, however, he wrote to say the disease had assumed a more malignant aspect in Taibach, and was no longer beneficially influenced by saline treatment. In my personal experience of the disease in this neighbourhood, I observe also a difference in Choleric attacks in the present visitation, as compared with that of 1832. At that period, so far as my observation and judgment avail me, the disease came on often more suddenly, with less premonitory illness, and was more instantly and directly severe and prostrative; people seemed death-struck from the first moment of attack. During the present year, I could generally trace previous illness, and, for the most part, where this had been promptly treated, Cholera was averted. In my hands a different *treatment*, too, has been required. On the former occasion, viz., in 1832, large doses of calomel and opium, 20 grains of the former, with a drachm of laudanum, promptly administered, were often given by me, and was the most successful remedy. In the present epidemic I have not found it answer well; smaller doses of calomel, and smaller doses of opium or morphine, have, so far as my judgment is concerned, answered better; and I have used the diacetate of lead also, and catechu and kino, in considerable doses, with good effect in checking profluvial discharges. In the case of children, also, the lead has answered well. In two or three cases where *infants* were attacked, they died. The feeble powers of infancy are soon prostrated; besides which, there is in *infants* a difference in the constitution of the blood, and in the blood corpuscles; the circulation has not had time to acquire the full self formative action, or constituents, as in older children; it partakes more of the character of *fœtal blood;* this, I apprehend, makes a difference. No doubt can exist, also, that not only does the blood differ in infants, children, and young people, but in *adults*. "A certain number of peculiar substances do certainly exist in the blood of some men, which are absent from the blood of others."—*Watson, Op. Cit.*, vol. ii., p. 720.

It seems to me, that in selecting remedies, and treating Cholera, the first thing we have to do is to endeavour to find out, so far as we can, the precise pathological condition of the patient,* together with the attendant circumstances, (such as his previous history, state of mind, condition when in health, &c.,) and then to determine on what we wish to effect, and the best mode of doing it.

With a view to explain my meaning, let me suppose I find a highly irritable and fluxual state of the alimentary tube, the aqueous parts of the blood running off rapidly, vomiting frequent, nervous system depressed, pulse sinking, and strength fast diminishing, and the functions of the liver and urinary apparatus entirely suspended. It may naturally occur to me, that in a group of such formidable symptoms, I wish to allay irritation, to rouse the dormant

These are all important points for consideration, and so are *all* the various causes and circumstances incident to subjects such as we have been considering, as the following passage from Liebig will plainly shew:—This distinguished philosopher truly observes,—"No one probably who is historically acquainted with the developement of chemistry, and of many parts of physics, will fail to perceive that the chief cause of the progress of these sciences has been the gradually acquired conviction, that *every natural phenomenon, every state, has more than one determining condition; that every effect has several causes; and it is the simple search after this plurality of causes, it is the separation of the effects, which distinguished the modern from the earlier chemistry.* —*Liebig's Animal Chemistry*, part 1, p. 163. I think the same line of argument and deduction is equally applicable to medical enquiry into the nature and causes of epidemics, and their appropriate treatment and prevention.—G. G. B.

* I should here have desired to offer some extracts from papers by Dr. James Bird, published in the "London Journal of Medicine!" but perceiving that Dr. J. Bird has recently published a pamphlet on Cholera, I have hesitated to do so. I have, however, *no hesitation* in strongly recommending the valuable papers to which I advert, to the careful consideration of the juniors of my profession.

functions of the nervous centres, to check the diarrhœa and vomiting, to get the liver and kidneys to act, and to render the stomach less irritable. I then think of remedies likely to effect this, taking the type of the disease, the climate in which it occurs, and many other important circumstances, into calculation. I may desire to try the effects of cold, as a sedative to the stomach, and I administer ice or cold water; to restrain the flux, I may give catechu and lead; to act on the liver, calomel may suggest itself to my mind; to support the frame, and sustain the nervous centres, opium offers advantages; and, accordingly, I proceed to consider, together with other points of treatment, which of these, or how many, I will give, and in what form I will administer them: and in like manner, throughout all the stages of the disease, would a man naturally reason, under whatever circumstances, or with whatever object in view.

This mode of reasoning, which I suggest for explanation sake to the general reader, will readily shew the danger of *nostrums*. And I would here advert to "chalk mixtures." I cannot say I have found chalk useful in malignant Cholera, and I think it may sometimes act as a mechanical irritant to the already too irritable mucous membrane. In mixed diarrhœa, and often in some forms of premonitory diarrhœa, it *may* be useful, and experience has shewn its value in combination with calomel, in certain cases; but in active Cholera, I believe it is *useless*.

I would advise, that families should rely on no "nostrums of any kind, but simply (under advice) keep medicines for use; and that each should enquire of their medical adviser, who knows their families and their constitutions, what had better be done in case of illness. I think this seems the rational mode of proceeding, and the most likely to be effectual. In many cases where people cannot do bet-

ter, doubtless it is well to have "*something*" at hand;* it may be, that a chalk mixture, with laudanum and catechu, compounded by a respectable chemist, the *ingredients* and dose being affixed to the label, will be as good as any thing, and *often* beneficially check premonitory diarrhœa. I know it has frequently done so. I am only endeavouring to point out general rules.

I have alluded to various, and sometimes apparently conflictive, plans of treatment, being often useful when judiciously put in force; and this is perfectly true, and embraces no novelty. With a view of illustrating my meaning, I offer the reader the following quotation from the pen of Dr. Latham:—"Acute rheumatism has experienced strange things at the hands of medical men. No disease has been treated by such various and opposite methods. Venesection has wrought its cure, and so has opium, and so has calomel, and so has colchicum, and so have drastic purgatives. I speak of these remedies in the sense which medical men imply when they talk (as they sometimes do) of this, that, or the other thing being their "sheet anchor;" meaning, that they rest upon it alone for the cure of the rheumatism, and employ other remedies either not at all, or for very subordinate purposes. And, indeed, I bear my testimony to the success of each of these different remedies, as far as that, under the use of each, I have seen patients get well.

"At the first view all this looks very strange. The cure, or seeming cure, of the same disease by different remedies, even by remedies which in their mode of operation have nothing in common, appears like luck or accident. At the first view it may shake one's faith in physic a little, and may a little excuse the pleasantry of some who choose to hint, that nature is our best friend after all, for that, do what

* To keep the mind at ease has its effect.

we will, she brings things to a prosperous issue in spite of our blind interference.

"But without disparaging the part that nature plays, I here see no subject of ridicule, and no fair reason for distrust of methods of rational treatment. The first maxim of all rational practice is, that nature is supreme; the next, that nature is obsequious. The end, whether bad or good, death or recovery, and every step and stage conducive to it, are the unquestionable work of nature. But nature, in all her powers and operations, allows herself to be led, directed, and controlled. And to lead, direct, or control for purposes of good, this is the business of the physician. But how to do it best, he has to exercise a choice of modes and means in every case, which, though never exempt from the possibility of error, becomes less fallible by the teaching of experience.

"This choice leads, and always will lead, to diversity of practice, which in no ways disparages, but rather tends to enlarge and to enrich, the resources of our art. It is not possible that the treatment of diseases shall be ever set at rest by the consent of physicians, or that fixed and uniform plans and remedies shall ever be adopted in cases bearing the same nosological name and character. At least it cannot be until each disease has its own specific antidote, or until each has disclosed some seminal principle from which it springs, and shown where it is, and what it is; some principle, too, it must be which is within reach, and which is destructible and easily destroyed."—*Dr. Latham's Lectures on Diseases of the Heart,*" vol. i., p. 181.

I have now completed the task I had assigned myself, and it only remains to apologise to the reader for the imperfect manner in which I have performed it. These pages have been written within the space of a few days, amidst the fatigues and anxieties of laborious practice, and with the

disadvantages of frequently interrupted leisure, and broken opportunity.

It appeared to me, that such a work would be useful to country gentlemen, members of boards of guardians and sanatory committees, and to the public generally. I was led to this conclusion, from the frequent enquiries made to me concerning points on which it treats. I shall rejoice if it is found useful, and be glad if in any way the results correspond with the object I had in view, by its general publication. I have neither written for profit, nor for fame; with respect to the former, if any accrue, it will be applied to the purpose for which I designed it, and the character of the pamphlet is too insignificant to give reputation to the writer. I consider the notes by far the most valuable part of the work; they have been collected by me, and extracted from references I have made in my "index rerum." I may hope, that at least the quotations will be of use to some of the juniors of my profession, as they have often proved to myself. For my own part, I always have looked on a wise man's truthful aphorisms, brought forward to elucidate and confirm an argument or affirmation, as in effect resembling the beautiful drawings, which at the same time illumine a page, and illustrate the subject of which it treats;* and I can truly say, I seldom open the works of such men, without feelings of reverence, gratitude, and respect, for the benefits they confer on mankind, and especially for the aid and improvement I derive from the perusal of their records.

* "It is no ordinary privilege to be permitted, by means of books, to hold converse with the wise and great; besides the information which they communicate, we find that we imbibe their zeal, that we adopt their tone and methods of research, and discipline our minds to the same course of thought and reasoning."—*Dr. Rigby's Introductory Lecture on Midwifery.* 1846.

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ERRATA.

At page 23, last line of text, for "*form*" read *force*.

At page 46, reference to note, for "Klein Grant's Medical Dictionary," read Klein Grant's *edition of Hooper's* Medical Dictionary.

At page 49, first line of note, for "We have proofs," read We have *no* proofs.

At page 52, line twelve, for "*deastise*" read *diastase*.

At page 62, *vol. i.* is referred to in note relating to "Dr. Watson's Work on Medicine."

This work is intended to convey information which may be of service to the Magistracy, Clergy, Members of Boards of Guardians and of Sanatory Boards, Heads of Families, and all Persons interested in "sanatory" matters, or engaged in lessening the amount of human sickness and mortality, by instituting and carrying out means for the removal of known and remediable causes of fevers and prevailing epidemics.

N.B. The profits of this publication (if any) will be given to some of the most exigent of the widows and orphans in the Borough of Swansea, who have suffered bereavement, during the prevalence of the late epidemic.

On application to the Publisher, at Swansea, forwarding 38 penny letter stamps, the work will be sent postage free to any part of the united kingdom.