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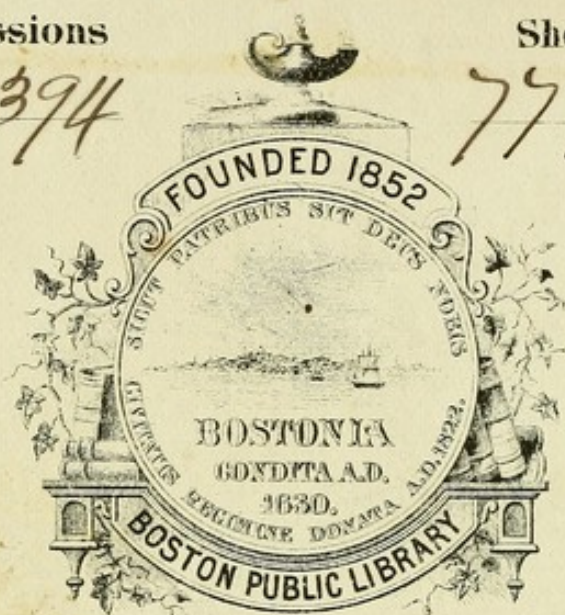
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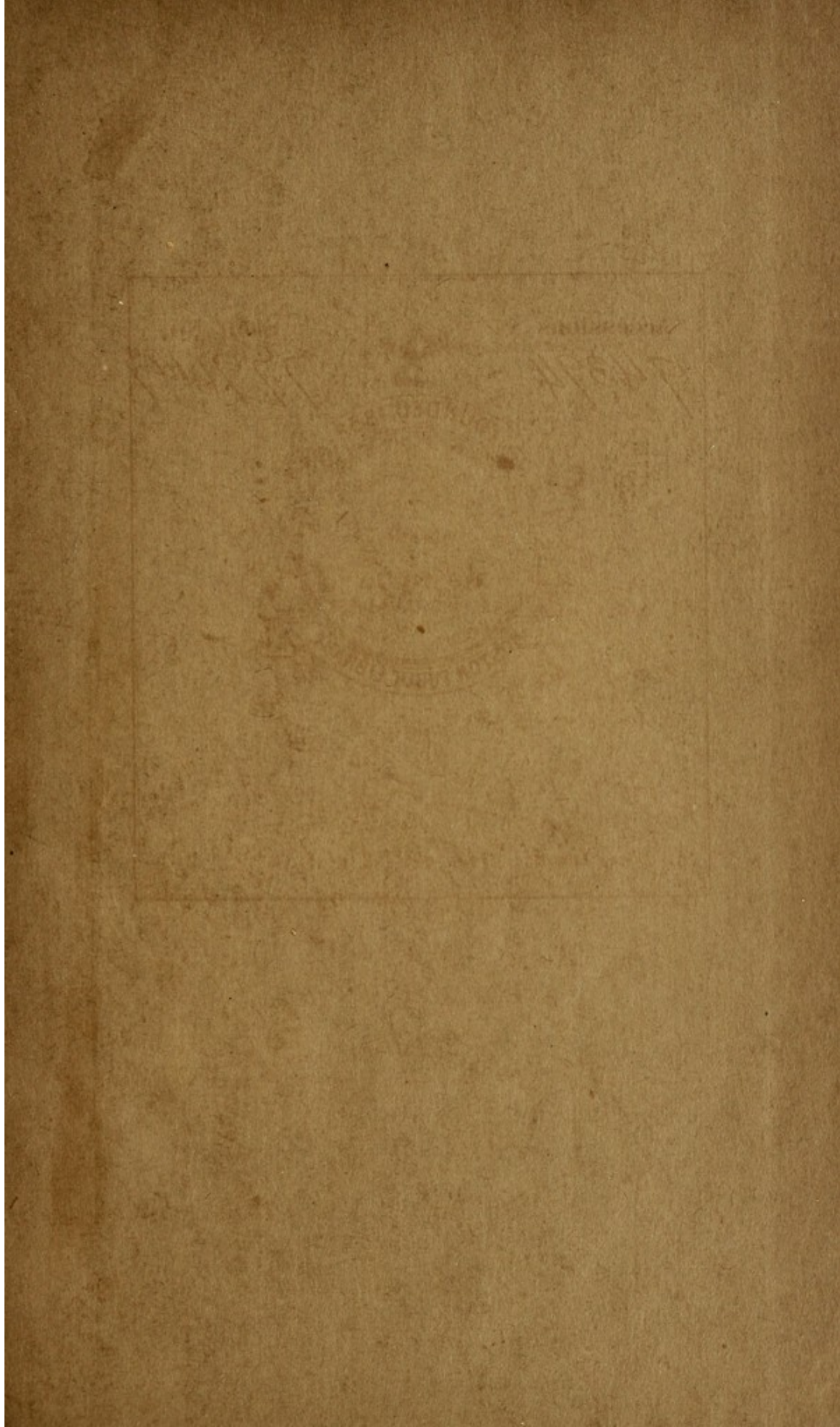
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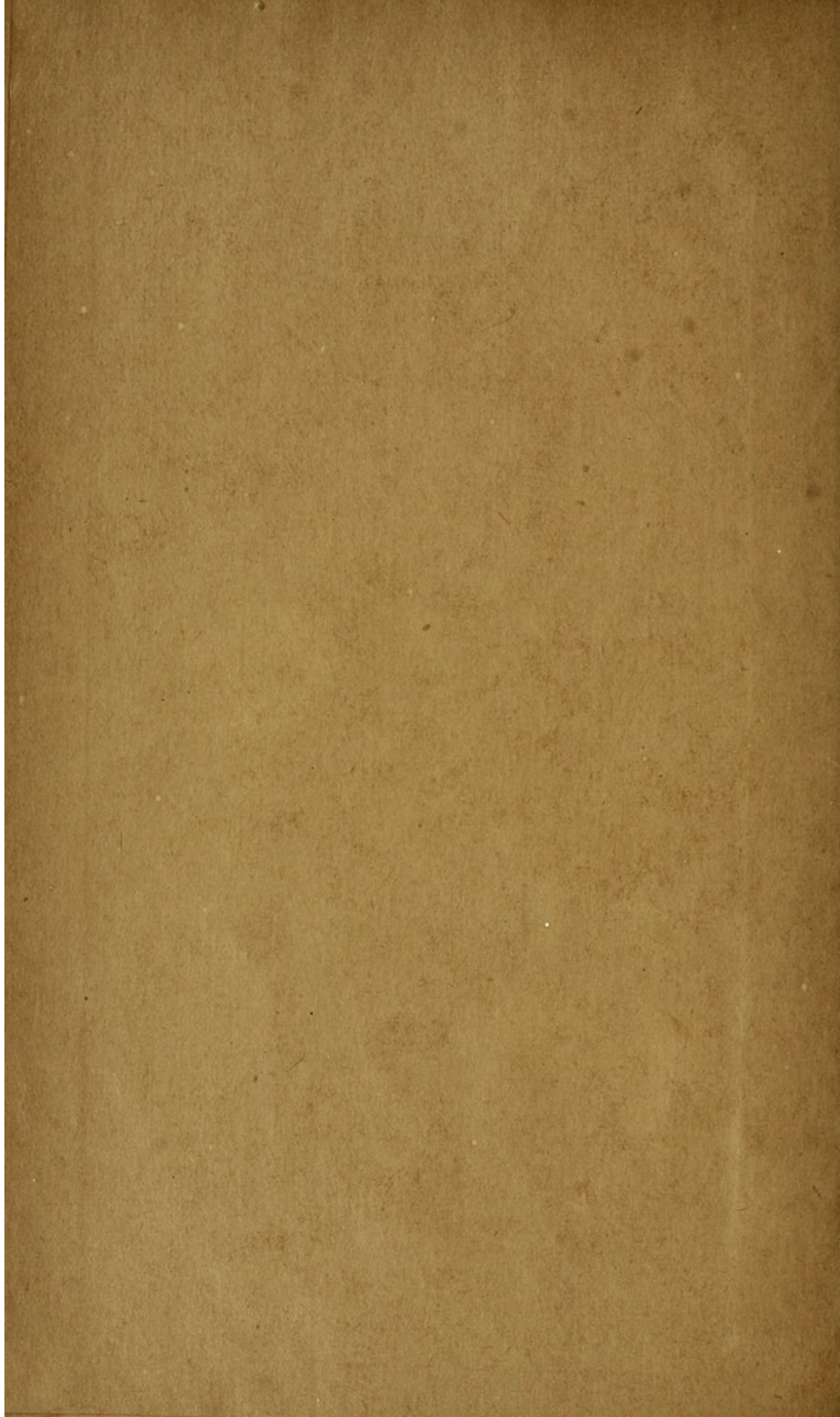


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EPIDEMIC CHOLERA:

Its Pathology and Treatment.

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BY

A. B. PALMER, M. D.

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Remarks on Epidemic Cholera.

The abundance of the permanent, and especially of the more ephemeral literature on the subject of cholera at the present time, produced and brought into relief by the recent spread of the disease over a considerable portion of the Eastern Continent, and its threatened invasion of the Western, would seem to render further additions unnecessary:—and I should not trouble my professional brethren with even the briefest exposition of my views on the subject, if I had speculations and theories only to offer, or if I had not much confidence in the therapeutical principles, and the practical details of treatment which I propose to present.

Having seen much of cholera in 1851, '52 and '54 in Chicago; and while acting as City Physician in 1852, (the year of its greatest prevalence among emigrants and others coming under municipal supervision,) having the privilege of observing the results of the disease when left to itself, as well as the modifications effected by a great variety of treatment: and having, furthermore, studied with all the interest, concentration and care of which I was capable during the whole three long seasons, directing the treatment in many hundreds of cases, I have been enabled to form some opinions on practical points which are held with much firmness, and therefore, submitted with less hesitancy and misgiving than otherwise would have been possible, upon a subject of such vast importance, and respecting which, among the most learned, there is so little that is fully settled, and so many opinions that are conflicting.

In what is to follow I shall attempt nothing like a complete treatise on Cholera, or indulge in any extended reference to its literature; giving merely such views as may seem practically most important, and such as are mainly the results of my own experience and reflection; neither following any particular leading, or avoiding any path that may have been pursued by others.

The subject is naturally divided into—

1. *The Causes of Cholera*—Essential, Predisposing and Accessory.
2. *Its Nature*—Symptomatology and Pathology; and,
3. *Treatment*—Prophylactic and Curative.

1. The essential *cause* of Cholera is certainly involved in obscurity. The numerous and opposing theories which have been put forth by writers on the subject, sufficiently prove this statement. But as no effect can exist without a cause—no disease without an antecedent producing it; and no specific, identical and definite disease, without a more or less specific cause operating upon or within the organism, we are at once forced to the conclusion, that a disease like cholera, distinct and identical in its character, far-spread and clearly migratory, affecting alike a great variety of persons, in different conditions and under divers circumstances, must be produced by some special agency capable of spreading and operating upon the system from without. As no agent of this kind can act where it is not, it has locality, and surrounds and pervades the bodies of those affected by it.

If, in the search after this subtle cause, no *positive* conclusions as to its exact nature have been arrived at, some of a negative character have been pretty clearly established. If science has not yet been able to say precisely what the cause of cholera is, it does say with a degree of certainty what it is not.

Though the disease had its origin in a hot and moist climate, and is most likely to spread in one of that character, no particular condition as to temperature or humidity can be considered as the essential cause, as it has prevailed in every climate, and at all seasons—in every state of the atmosphere as to dryness or humidity, density or rarity. Neither does it depend upon any appreciable electrical state, as it has been found by experiment, that the most opposite electrical conditions exist where the disease prevails. Though certain relations seem to exist between this cause and paludal malaria or marsh miasmata, yet the cause of cholera cannot be common malaria, as it has often prevailed where intermittents were never known, and has avoided, in its progress, many districts where these fevers most prevailed. Though the presence or absence of ozone may modify the action of the cholera cause, conditions as to ozone cannot be that cause itself, as cholera has prevailed

both when there was an abundance and deficiency of this active state of oxygen.

From all the facts in the case it seems difficult to avoid the conclusion that there is not only a specific and peculiar cause for the disease, but that such cause consists of a *material poison*; and this is now the general if not universal opinion of all who have written upon the subject. All the theories agree in the one point of there being a poison which gives rise to the disease, and beyond a doubt the facts which have been observed, can be best, and, indeed, alone satisfactorily accounted for by this supposition.

Not only is there doubt as to what this poison is, but there is much obscurity as to its mode of production, of multiplication and diffusion. However produced or propagated, it is certainly progressive. It comes to a locality, it acts, it goes away, or becomes inert. It was either inexhaustible in its amount and force in its original source, an idea not to be entertained when considering the immense extent of its prevalence, or it is reinforced, as it progresses, by additions to its mass. Not knowing what the poison really is, we can only speculate upon its mode of increase.

If it be supposed to be a result of chemical actions, the law of *catalysis* will aid in explaining its multiplication—a peculiar agent acting by its presence in inducing chemical changes resulting in the poisonous production. If the poison be supposed to be an *organism*, whether vegetable or animal, the law of propagation will account for the increase, and either of these subtle forms of matter may be diffused by increase, by winds, and by intercommunication. There can be little doubt that the atmosphere is the chief medium of this diffusion: but particles of catalytic or germinal matter may be carried by ships, by caravans, or by persons, from one point to another, and when thus brought into an atmosphere containing the necessary ingredients for the peculiar chemical changes or organic reproductions, the poison may be abundantly produced.

The question of the contagiousness of cholera is one that has been much mooted, and it must be confessed, sometimes, without a clear appreciation of what constitutes a contagious disease. Strictly and properly defined, a contagious disease is one produced by a poison generated in the body of an individual affected by the same malady. Thus in small pox an animal poison is produced in the progress of the

affection, which, when communicated by any means to one susceptible to its action, the same disease is reproduced.

The facts in the history of cholera do not prove that this poison is exclusively produced in the bodies of the sick—but, on the contrary, in my judgment, they indicate that the poison is often, at least, produced independently of the bodies of those laboring under the disease, and that it is usually produced, multiplied and diffused independently of those affected by it. The detailed reasons for this opinion the limits of this article will not allow to be stated. But that opinion, long since formed by reading the history of its progress and its incursions, and confirmed by a careful observation of its occurrence and spread in Chicago and other places in the West, has not been seriously shaken by all the authoritative opinions and ingenious arguments which have since appeared. Of nothing have I been more clearly convinced from general observation, than that when cholera is prevailing in a locality, those who come in contact with cholera patients are not perceptibly more liable to the disease than those who, exposed to the same general conditions, avoid such contact. I by no means affirm that the poison is to no extent, or in no degree produced in the sick, but it seems to me clearly that it is not wholly or chiefly so produced. I cannot doubt that it is multiplied, if not exclusively, yet very largely, exterior to the bodies of cholera patients. All diseases dependent upon a poison are *infectious*, but all dependent upon a poison are not, in the proper sense of that term, contagious. *Contagion* is a virus or effluvia generated in a diseased body, and communicated by contact or otherwise; *infection* is anything that taints or corrupts; hence it includes contagion, and any other morbid, noxious matters which may excite disease in a healthy body. While, therefore, not denying its possible contagiousness, I do dissent from the opinion, that as in small-pox, the poison is produced and multiplied exclusively, or even chiefly in the bodies of the sick, and that the disease is ordinarily produced by this poison, unchanged, being conveyed to others. The poison may have originated out of the body, and is certainly multiplied out of it.

Though so much doubt exists as to the essential nature of the cholera-cause, and the particular method of its producing its effects, yet the circumstances and conditions as it regards localities and persons which favor the spread of the poison and render its action more effectual, are well established. Though in particular cases general rules

are set at defiance, yet the fact respecting co-operating causes are sufficiently uniform to establish the general rules.

Briefly, and generally stated, the *localities* most liable to the spread of cholera, other things being equal, are low, moist, and particularly *filthy* situations. Warm climates and seasons are more favorable than cold, and a densely populated region more than one sparsely settled. It is more liable to follow water-courses and thoroughfares, partly because these are usually more low, filthy, and densely populated; and partly, no doubt, because the poison is conveyed by intercommunication. Still, in its progress it takes general, and sometimes particular courses, in obedience to laws we do not understand. All experience has shown that the existence of decomposing organic material in the soil and the air, favors the spread of the disease, probably by furnishing a pabulum for the development of the poison, and a nidus for its existence and action in the bodies of those inhaling the foul air or imbibing foul ingesta.

With regard to the classes of persons most liable in the same localities to be attacked, and become its victims,—the intemperate, the destitute, the filthy, the vicious, the enfeebled, the terrified, and the degraded, are immeasurably more subject to its ravages than those in opposite conditions. Yet when the poison is abundant and possesses great activity, no class or condition can claim an exemption; but the cases are so rare in which the poison is sufficiently intense to affect perfectly healthy persons, who place themselves under the most favorable circumstances, and avoid all predisposing or accessory causes—in short, obey all the hygienic laws, that the violation of these laws become the conditions of attacks—in other words, the *predisposing or accessory causes*, in a vast majority of cases at least, become necessary antecedents to the production of the disease. So much have the habits and state of individuals to do with the prevalence, or suppression of this scourge, that, as a general proposition, it may be stated that the “cholera poison owes its potentiality to the conditions in which it finds the subjects of its invasion.” In this view of the subject, a knowledge and the avoidance of these particular predisposing causes become matters of the most vital importance.

The existence of decomposing matter in the system has already been referred to as a condition favoring the operation of the cholera poison. This is a view now very generally entertained, not only in relation to cholera, but to other zymotic diseases as well. Dr. WILKINSON.

Carpenter, of London, arranges the generally recognized predisposing causes of these diseases under three heads, viz.: 1. Those which tend to introduce into the system decomposing matter that has been generated in some external source. 2. Those which occasion an increased production of decomposing matter in the system itself; and, 3. Those which obstruct the elimination of the decomposing matter naturally or excessively generated within the system, or abnormally introduced into it from without.

Under the *first* head is ranked the ingestion of putrescent food, of water contaminated by sewage or other decomposing matter; and the inspiration of air charged with putrescent or miasmatic emanations.

Under the *second*, any unusual source of degeneration of tissues within the body, such as excessive muscular exercise, injuries, etc.; and here may be added, fear, despondency, and other depressing passions; and the derangement of the secretions.

Under the *third*, an insufficient supply of air, a high external temperature, (which slackens the respiratory process,) and the ingestion of alcohol;—to which should be added, the sudden occurrence of a cooler and moister atmosphere, as a rain-storm after unusual heat, checking secretion from the skin. If there be added to this category of causes insufficient food, and whatever influence not enumerated depressing the vital energies,—and particularly if there be added also those substances whether in the shape of indigestible food, or of medicines or luxuries which will irritate the mucous membrane of the stomach and bowels, we have the conditions predisposing to cholera.

The history of cholera occurring under my own observation in Chicago, during the seasons already referred to, corroborate, indeed, is the chief foundation of the views which have been taken of the etiology of the disease. The minutely recorded details might be of interest, but they are necessarily excluded by the limits I have assigned myself in this paper.

With a reference to the following historical incident, I shall close the subject of the *cause* of cholera, and proceed to the other divisions of the general subject already indicated.

Dr. Verrollot, Physician to the French Embassy, near the Sublime Porte, has written a minute history of the spread of the epidemic in 1847 through Asia and a part of Europe. In describing its general spread and terrible ravages, from the shores of the Caspian Sea, up the

River Volga, among the semi-civilized Musselmen, and still more filthy and degraded Russians, he mentions with great, but reasonable enthusiasm, one place as a remarkable exception :

“There is a small Moravian Colony called Sarepta, situated in a bend of the river, in the midst of the Kalmuck hordes, eulogized by all travelers for its remarkable industry and minute cleanliness; and for all other laudable and fortunate features of character. The cholera seemed to respect this sacred spot, passing by in 1830 and in 1848, without inflicting on it the least evil.” This fact, corroborated as it is by multitudes of others of like character, speaks volumes on the subject of prevention;—and the success which has attended the various sanitary measures in Europe, and, so far, in this country, during the present prevalence of the disease, confirms these general etiological views. If the inhabited globe were a Sarepta, this terrible scourge would disappear from it forever. The conditions for the origination, the multiplication and extension of the poison, would cease to exist, and there would be no subjects favorable to its attacks.

The phenomena—the symptomatology and pathology of cholera—I propose to present in the briefest manner, a consideration of the treatment of the disease being the chief object now in view.

The external features or symptoms of the disease are too familiar to require particular description, and only sufficient reference will be made to them to render these remarks upon treatment intelligible.

The disease is usually divided into *four* stages. These stages, as is the case with the more or less arbitrary divisions into stages of most other diseases, run into each other, and are not always well defined; neither do they all exist in every instance, but in their general outline may commonly be observed.

The *first* is the *premonitory stage*, marked by general lassitude, dull pain above the eyes, sometimes constrictions in the calves of the legs, disturbed digestion, abdominal uneasiness, slightly coated tongue, and *diarrhœa*. This stage is not always observed, and when it is, is liable to vary much in the number, severity, and duration of the symptoms; but it usually may be traced, the premonitory diarrhœa occurring in a very large proportion of the ordinary cases, continuing from several hours to some days before the full development of the disease, or the arrival of the

Second stage, which is marked by active vomiting and purging of a

fluid soon becoming of a rice-water appearance; by great thirst, coldness of the surface, severe spasmodic pain or cramps—particularly in the abdomen and extremities. In the commencement of this stage the pulse is sometimes a little excited, and not unfrequently quite firm, but it soon becomes more and more feeble as the impression of the poison is more profound, and as the exhausting discharges continue. Towards the latter part of this stage, the surface becomes much shrunken and more or less blue. When the disease is severe, this stage only lasts a few hours—in less violent cases it may last a day or more—when, if reaction and improvement do not occur, it passes into the

Third, or Stage of Collapse, marked by loss of circulation, labored respiration; the skin being shriveled, livid, and bathed with cold perspiration. The discharges sometimes continue in this stage, though less profusely; at other times they are suspended, either from exhaustion of the fluids of the system, or from a suspension of nearly all vital action. The pain and cramps sometimes continue in this stage, while in other cases they cease; the patient becoming more quiet and comatose. During some parts of the second stage a ringing in the ears usually occurs, and the voice becomes husky and peculiar. These symptoms usually continue throughout the remainder of the disease, the huskiness of the voice increasing in the third stage, until the patient is able often only to articulate in a whisper. Those who survive the active onset of a severe attack, especially if the disease pass into the third stage, are liable to the

Fourth Stage, presenting the characters of a low irritative fever, generally accompanied by protracted local congestions, or a low form of inflammation of the mucous membrane of the intestines, particularly of the follicles, of the mesenteric glands and other abdominal viscera and of the brain and spinal marrow. Occasionally cases of cholera morbus, or what has been called English cholera, occur, and also serous vomiting and purging during the progress of malarial fevers, which, in their external symptoms, resemble very nearly genuine epidemic or Asiatic cholera; yet differing, as I apprehend, in the essential cause, and certainly as it regards fatality—the former class of cases being almost always amenable to proper treatment, even if the treatment be not commenced until in an advanced stage; while the mortality of the latter, when the same apparent advanced condition is permitted to occur, is too well known. Dissimilar causes not unfrequently produce

similar, though perhaps not in every respect identical effects, and these cases of sporadic and accidental cholera, are presumed not to be produced by the specific poison which gives the epidemic variety its virulence.

The particular manner in which the cholera-poison when introduced into the system produces its effects, the phenomena just referred to, is still a matter of conjecture. Whether by changing the chemico-vital relations of the blood, or by primarily attaching itself to the nervous or other tissues and changing their actions, we may not say; but soon, and earliest, its effects are manifested upon the *ganglionic nervous system*. Though these nerves of organic life are not always found perceptibly changed in structure after death, they are sometimes softened and enlarged, and their functions in the progress of the disease are modified, diminished, and in severe cases rapidly over-powered. That portion of the brain and nervous system which is engaged in thought and mental sensibility, is left comparatively undisturbed. While all the functions depending upon the organic nerves, such as nutrition, secretion, exudation, circulation, and respiration; and their consequences, as animal heat, and the general movements of the system are either enfeebled, suspended or greatly modified. Digestion seems entirely suspended—glandular secretions, particularly of the liver and kidneys, are either suspended or greatly diminished. The circulation of the blood so directly under the control of the organic nerves, is much retarded, apparently to a great extent, at least, by spasm of the smaller vessels of the surface; the vital fluid retiring to and congesting the internal organs. Respiration is diminished and labored; the blood, consequently, is not well oxygenated, and animal heat is reduced.

While these general morbid phenomena are occurring, and frequently as the first in the train of apparent symptoms, the circulation and secretion of the mucous membrane of the alimentary canal become specially deranged. The ganglionic system everywhere, but more particularly in the stomach and intestines, governs the capillary circulation. The paralyzing, deranging influence of the cholera-poison upon the organic nerves produces the derangement of action causing the diarrhœa, and it increases in its effect during the more active stage of the disease. The blood flows into these vessels in unusual quantities, producing hyperæmia, irritation and copious discharges, consisting of the thinner parts of the blood, containing a large portion of its salts. The blood thus becoming

deprived of its more fluid portions, of its salts, and, by diminished respiration, of its oxygen; and, being moreover loaded with urea and the elements of bile from the suppression of the secretions of the kidneys and liver, is unfit for the uses of the system—the spinal nerves then become deranged in their functions and the most painful spasms occur. When the disease in a grave form arrives at this stage and is uninfluenced by treatment, collapse and death are the usual results.

When from the somewhat less severe form of the disease or greater powers of endurance, a patient survives these conditions, the increased quantity of blood in the mucous membrane of the alimentary canal produces an inflammatory-hyperæmia, and in many cases a decided degree of inflammation. There is usually, however, no organizable plastic matter poured out, but a material something like the exudation of diphtheria: and perhaps the most characteristic product of the disease is an infiltration of a peculiar granular matter into the mucous membrane, and particularly into the glands of the intestines. The investigations of Harner, of Pirogoff and others, and the delineations of Lebert, go to show the inflammatory character in many cases, of the hyperæmia and exudation, when death does not occur too soon to allow of its development. Not only the alimentary canal, but the membranes of the brain and spinal marrow sometimes, and more rarely the lungs, are involved in inflammation.

The only marked appearance approaching to uniformity in the bodies of those dying in the collapsed, or asphyxiated state of cholera is that of congestion or hyperæmia, with the peculiar infiltrations into the glands of the intestines already referred to, the latter especially, occurring oftener in the more protracted cases.

Dr. George Johnson, of London, has recently attempted to show that the loss of the fluids of the blood is not the chief cause of the severe and fatal symptoms in cholera, but that they are due to the impeded passage of the blood through the lungs from the right to the left side of the heart; and that this obstruction is produced by a morbid contraction of the muscular coats of the pulmonary arteries, and that this contraction is in turn caused by a specific morbid poison in the blood. It cannot be doubted that impeded circulation of the blood through the lungs, and imperfect oxygenation of that fluid contribute largely to the fatal results; but yet it is true that such obstruction of circulation and deficient oxygenation, *very seldom* occur until the blood

is rendered thick and incapable of circulation by loss of its fluids and salts, and by the retention within it of urea and the elements of bile—though probably the blood is rendered still more injurious by the presence, in addition, of a specific morbid poison. The loss of the fluids is by no means the sole cause of the fatal symptoms, as patients occasionally die without such loss; but such cases are the very rare exceptions, and in ninety-nine out of every hundred deaths from cholera, the loss of the fluids is a chief, and even essential element, in the complex condition producing the results. The practical importance of these pathological views will be more fully appreciated when the subject of treatment is considered.

In reviewing the ground already passed over, it may be stated that cholera is essentially produced by a peculiar poison, the exact nature of which is not fully understood; that this poison is aided in its production and diffusion by certain local conditions, the chief of which is filth; that the action of this poison in the system is promoted by the presence in the blood of decomposing organic materials; that the effects of the poison are first manifested upon the ganglionic or organic system of nerves; that very generally, among the earliest and most important morbid effects which the paralyzed and deranged condition of the nervous force produces, are congestion and irritation of the mucous membrane of the alimentary canal, and profuse exhalations from its surface, leading to a watery diarrhœa, and at length to violent vomiting and purging of a nearly transparent fluid; that losses of the fluid portions of the blood, together with the retention of certain excrementitious matters, aided, probably, by the peculiar cholera poison, so change the physical, chemical, and vital conditions of that fluid as to produce spasms of vessels, and cramps of various muscles—to produce obstructed circulation and respiration, and finally, collapse and death—that occasionally, though very rarely, the cholera poison effects such changes in the blood and in the actions of the nervous system, as to suspend the necessary life functions, and cause speedy death without the loss of fluids; but that such cases are so few and exceptional as to afford no basis for a rule of practice in the ordinary forms of the disease.

We are thus brought to the last and most important division of the subject :

3. *The Treatment of Cholera—Prophylactic and Curative.*

The prophylactic management of this disease, so apt to be fatal when it has made an attack, and usually so easily prevented, is of the first importance, and of course consists in the avoidance of its causes. These causes having already been referred to, need not be repeated in detail, though a few particulars require a more special notice.

The views entertained of the mode of propagation of the cholera poison, and the local character of many of the predisposing causes which give that poison its potency; and particularly my own observation while acting as the Medical Adviser of the Board of Health of Chicago, have impressed me with the great importance of giving special attention to the particular localities especially affected in a city or town, and to the groups of persons among whom the disease may appear.

In such particular localities where the disease is raging, it will usually be found that many are crowded together under unfavorable hygienic conditions; and when this is the case, no pains or expense should be spared to remove instantly every such condition, and to effect a dispersion of the persons thus grouped—due regard being had to the safety of others where these persons may be sent. If those having been thus exposed to even a concentration of the poison are well washed in person and changed in apparel, and are in their new situation placed in clean and well ventilated apartments, the danger to others among whom they may be placed will be extremely slight, even should the persons brought among them experience attacks.

As there will usually be difficulty in finding places among others for persons fleeing from a locality specially infected, it would be a most wise and humane provision to have temporary buildings or tents erected in the most favorable positions in the neighborhood of an infected city, where such persons may be taken and provided for under the most rigid sanitary regulations. The propriety of such proceedings, and their immense influence in arresting the progress of the disease and saving life, cannot be questioned; nor can they be too strongly insisted upon by those who act as guardians of the public health.

In a preceding passage, the use of alcoholic drinks was simply mentioned, on the authority of Dr. Carpenter, as a predisposing cause of cholera; but as there is at least a remnant of a popular opinion lingering among some, that these drinks act as preventives to the disease, the subject may be referred to in this connection. The results of all mod-

ern research, and of the profoundest professional reasoning respecting the physiological action of alcohol, as well as all observation everywhere of its influence upon cholera, concur in the conclusion, that so far from being a preventive to the disease, however used, it especially predisposes to attacks, and renders the cases, when occurring, more severe. It interferes with the process of respiration, favors the accumulation of effete and decomposing materials within the body, and tends to irritate the mucous membrane of the stomach and bowels. When taken in any considerable quantity, it cannot fail to irritate the nervous centres, and derange the functions of organic as well as of animal life; and it has not the slightest claim to be regarded as an antidote to the cholera poison. There are indeed no known specifics for destroying the cholera poison or of preventing directly its effects, and all medication should be avoided unless symptoms occur. The system should be kept in as natural, as uniform and as healthy a condition as possible, with the mind calm and confiding, yet active and cheerful.

The therapeutics of the disease—the principles and details of its treatment—will be the next subject in order.

Although Cholera is a disease so uniform in its essential cause, and so identical in its nature, yet should an attempt be made to follow “authorities” in a description of its curative treatment, so many diverse and conflicting statements would be met with, requiring record, that the writer, the reader, and the inexperienced practitioner in the disease, inclined to be led by such a guide, would be alike confounded. Nothing, in fact, as to treatment in this disease, seems quite settled in the general mind of the profession; and this, taken in connection with the further fact, that statistics upon a large scale, from the earliest period of its authentic history to the present time, have shown that from forty-five to fifty-five per cent. of the genuine cholera attacks have proved fatal, would seem to indicate that there is little power, or at least of choice, in remedies. Still there is both power and choice of remedies in the disease; and I cannot restrain an expression of the conviction, that there are few diseases more susceptible of being influenced in their results by treatment, than this; very few, where the services of a prompt and skillful physician can be made more valuable. Most other acute diseases with which we meet will terminate favorably if left to themselves, while a large proportion of these will not; and when, in genuine cases, there is a

large proportion of recoveries, as may be the case, the result is, without doubt, due to treatment, and demonstrates its great value.

It would seem strange that a disease so uniform in its causes and course, and withal, so capable of being influenced by remedies, should have remained so long a time under investigation, without a course of treatment being found, upon the adoption of which the profession generally would agree. But, though the disease is thus essentially uniform and identical, there are numerous varieties as to several particulars; and, more than this, there are contradictory elements and conflicting indications in each case; and it is to be regretted that writers generally have not analyzed these elements as closely, and pointed out the conflicting indications as discriminatively as is desirable. The arrival at fixed and generally accepted truths, when the problems are complicated, and dependent for their solution upon numerous observations made by many persons, and upon the deductions of various minds of different constitutions, is necessarily a slow process. Unfortunately also, for the arrival at truth, many who have speculated most upon cholera, and have furnished the profession with the largest portion of its literature on the subject, have seen very little or nothing of the disease. When all these circumstances are considered, we need not be so much surprised at the present state of the therapeutics of the affection.

Though what is to follow may or may not add to the variety of opinions already recorded, it will not be confused and obscured by the statement and examination of many contradictory methods of treatment; but there will be an attempt only to give a description of the treatment which my own experience, study, and reflections, have led me to regard as the best of which I have any knowledge. There is, however, no little difficulty in giving a clear, discriminative, and intelligible description of the treatment which should be pursued as adapted to the different cases met with and their various stages, in actual practice. Indeed, in the details of proper management, so much depends upon the peculiarities any particular case may present, the different degrees of rapidity with which it may pass through its different stages, the constitutional and other special conditions of the patient in various respects, the different manner in which remedies may be borne, the special impression upon various organs and functions which may be produced by them, etc.—so much of the appearances of the patient

from which we form conclusions, can be learned only by experience—and in the doses and timing of medicines so much must be left to the judgment, that a full and correct representation of the best treatment with all its adaptations, cannot, without illustrations, be made.

As the best means, however, of approximating to such a representation, I shall first express some general views of indications and the means of fulfilling them, based upon pathological and therapeutical principles, and afterwards attempt a more minute and specific account of the manner in which I would apply these principles—of the special mode of procedure in the treatment of cases.

In the absence of such a positive pathology as reveals clearly the nature and succession of the essential morbid actions, and as points unerringly to all the proper remedies—in the absence also of ascertained specifics, the attention of the physician should rest upon such morbid conditions as he believes to be present, and his efforts should be directed to the correction or removal of such conditions; and if the primary or essential diseased condition, and the means for directly removing it evade his knowledge or power, he must direct his efforts to the correction or removal of the obvious disturbances of the functions; and thus by putting the system as nearly as possible in its normal condition, prepare it to endure the shock of the morbid cause, and assist it by every possible means, as a sailor would a dismantled ship, to weather the storm.

It has already been stated that the cause of cholera makes an early and decided impression upon the ganglionic system of nerves—those nerves presiding over the respiratory, circulatory, secretory and assimilative functions; and that as a consequence these functions are, each in its peculiar mode, and all more or less seriously, disturbed. The stomach and bowels are generally the seat of such decided irritation, and the source of such peculiar and profuse discharges, as to be regarded by many who have written upon the subject as points of a primary and principal morbid impression. But, whether the impression upon the mucous membrane is primary, or whether, as I believe, these morbid phenomena are the results of the impressions upon the nerves of organic life, the symptoms themselves are of the greatest importance; and in a large majority of instances, require first, and most imperatively, the attention of the physician; for, whatever may be said by those who have studied this subject in the closet rather than at the

bedside, if this irritation be not allayed, and these discharges be not controlled, neither nourishments or medicines are retained in the system, and the patient is soon deprived of a large part of the fluid portions of his blood, the remainder becoming unfit for its uses, and he is soon exhausted, and often speedily carried beyond the reach even of hope.

It must, however, be borne in mind, that this irritation, and these discharges are not the sole causes of the depression and collapse—in fact, that in some of the most rapidly fatal cases, no evacuations occur; and that diminished circulation, diminished respiration, diminished animal heat, and diminished glandular secretions (of the liver and kidneys) are more constant symptoms than profuse evacuations; and, therefore, in the treatment, other conditions than the vomiting and purging are entitled to constant attention. In this view of the subject, the following leading indications are presented:

1st. To arouse and maintain the sensibility and proper action of the organic nervous system; and

2d. To excite and correct the action of those organs whose natural functions have been suspended or perverted, whether from direct impressions upon them, or by a failure of that nervous influence upon which their integrity depends—and in a more particular manner—often first in time as well as in importance, when the gastro-intestinal irritation and exhausting discharges are present, the indications are to allay that irritation and arrest the discharges.

Now, by what means shall these indications be fulfilled? Unfortunately we are yet but little acquainted with any direct beneficial influence of remedies over the organic nervous system. When this system is debilitated or deranged in chronic diseases, hygienic regulations are more efficient than any known specific medicines. But here the most prompt action is required. There is, in cholera, so much prostration, such an appearance, and real danger, of rapid sinking and fatal exhaustion, so much spasm and pain, and such profuse discharges, that stimulants and anodynes are resorted to almost instinctively, and alcohol is often given; and opium, though so useful when properly managed, may be administered with too much freedom, and is frequently used with far too little discrimination.

There can be little doubt that opium, alcoholic mixtures, chloroform, etc., particularly when given in free doses, tend to depress rather

than exalt the energy of the nervous system of organic life. Though this may not be the effect of these articles uniformly and in all doses, it certainly is often, and generally, even in their primary actions, when administered in large quantities. If alcohol in certain quantities and under certain circumstances does temporarily excite the nerves, still by depriving the blood of its oxygen, diminishing the natural effects of respiration, and retarding other vital changes, its secondary effects become often powerfully depressing. The same is true of opium and other narcotics in a greater or less degree. These facts should not be lost sight of, and while these articles may be useful, and opium particularly, even in pretty free doses, quite essential for fulfilling the indications, of allaying irritation, and arresting vomiting and purging, regard should always be paid to their depressing effects on the vital powers. No language can be too strong in condemning their use in large quantities, in the *advanced* stages of the disease. Both principles and experience go against the practice, and facts under my own observation have convinced me that many lives have been sacrificed by it. *Alcohol is very seldom useful in cholera under any circumstances.* It not only fails to meet the indication of sustaining the vital powers, but it also usually fails to exert a beneficial influence over the vomiting and purging; in fact, it increases the irritation of the mucous membrane, and disposes it as well as the brain and other parts of the system to inflammation and its consequences, in case the patient survives the earlier stages of the disease.

Opium in proper doses and combinations in the earlier stages of cholera, before the vital powers are much exhausted, and while irritation of the stomach and bowels is the most prominent symptom, is *the great remedy* in the disease; or at least one of the prominent and essential items of a correct treatment. It is by far the most potent remedy we possess for allaying that irritation, arresting the flow of fluids to the mucous surface, and controlling the debilitating discharges; and when from its use, these effects are produced, the system, by other proper aids, is generally enabled to rally, and struggle successfully against the morbid influences. But when the powers of life are low, when the blood is deficient in oxygen, loaded and black with carbon,—the free administration of an article, which in full doses produces even in healthy persons similar effects, can but be productive of severe and fatal results. I dwell upon this point because of its exceeding importance,

and will recur to it again when describing the particular mode of managing cases.

In selecting stimulants then, to arouse the nervous energy, we should prefer those which will not diminish the oxygen of the blood, as some of the most constant and dangerous symptoms are produced by such diminution. Opium, alcohol, chloroform, and ether, as already stated, have to a greater or less extent that effect.

With reference to this indication, we shall experience better results from such articles as quinine, coffee, mustard, ammonia, capsicum, camphor, cassia, valerian, and oil of turpentine.

An emetic dose of salt and mustard is strongly recommended by some, and may have a good effect in arousing the organic nerves and changing the train of morbid actions. But if this is resorted to at all, it should only be considered as preliminary to other treatment, and the period of quiet succeeding its immediate operation must not be neglected for the introduction of other remedies.

But there is another system of means for answering this indication of arousing the nervous energy, which is worthy of attention. We know that when the functions of the organic nerves are overcome and suspended by a poisonous dose of prussic acid, opium, alcohol, or chloroform, the most effectual means of arousing them to action, are, sudden dashings of cold water upon the surface, cold affusions continued for a short time, and repeated, and the abundant inhalation of fresh air, improved by the addition of the vapor of ammonia or oxygen gas.

We might infer that this same system of means would be useful in cholera, and in many cases it has been so found. When these cold applications are used, during their intermissions, re-action should be encouraged by frictions, warm flannels and sinapisms.

I have used these cold affusions only in a few cases, and most of those were in a condition not favorable for the success of any treatment; but I have generally been able to procure a degree of re-action, and the results of the experiments made, impressed me favorably with the remedy. I regard it worthy of further trial.

To fulfill the second general indication, viz. : that of exciting the dormant, and correcting the morbid action of the different distinct organs, such as the liver, stomach, kidneys, etc., thus endeavoring to restore, as far as possible, their different functions to their normal conditions, a variety of means must be used.

To correct the exhalant and other functions of the stomach and bowels, to allay the irritation and arrest the profuse discharges, opium, in my opinion, as anticipated by preceding remarks, is the chief remedy. In order that it be retained and have a speedy effect, abstinence from drinks in considerable quantities must be enjoined, and the medicine given in minute division, triturated with some other substance; and its effects may be aided by counter-irritation over the epigastrium and indeed over the whole abdomen, and sometimes by various astringents. The acetate of lead is regarded by many as the most useful of the astringents; but it effects the purging more than the vomiting, and controls this purging much more manifestly when given by enema, after an impression has been made upon the stomach with opium. When thus used in a moderate quantity of fluid, and combined with a quantity of laudanum, varying with the condition of the patient and the amount of opium previously taken, the effect is often most happy.

To excite the liver to its natural secretion, and modify other secretions, thereby relieving the blood of much of its effete matter, and when thus operating, usually changing the whole character of the disease, calomel should be given in repeated doses. The use of this article I consider of exceeding importance. My observations upon it have been careful and abundant, and I think I cannot be mistaken. The discharges may often be checked without its use, and temporary improvement produced; but unless the secretion of the liver be excited, (and calomel when properly given and retained, tends powerfully, and far more than any other article, to excite that secretion,) the cholera discharges will again return, and severe consequences follow. The indication for calomel exists in the early stages of the disease and continues present until the symptoms are controlled, the action of the liver restored, or until a sufficient quantity is given to produce all the beneficial effects of which the medicine is capable.

I am by no means insensible to the injurious effects, both proximate and remote, which the free, or even moderate use of mercury, under many circumstances, produces. I have no sympathy with that class of practitioners forever seeing some "liver complaint," or "billious obstructions," and hurling heroic doses of calomel, or everlasting "blue pills," at these, so often, imaginary difficulties. But mercury is a medicine of power, and has its uses; and cholera is one of the diseases where its remedial virtues are greatest. In this disease it seldom pro-

duces salivation or other remote injurious consequences, and even if it did much more frequently, considering the extreme danger of the patient and the good effect it produces, we should be justified in its use.

To excite the action of the kidneys, diuretics may be given whenever the stomach will retain them, and when they will not interfere with other more necessary remedies, or produce any other unpleasant effects. Oil of turpentine and spts. nit. dulc. are among the best articles of this class. They are however so uncertain in their operations, that they should not be given at the risk of disturbing the stomach or bowels.

To counteract the deranged state of the sanguineous circulation, which is always great in the full formed stage, amounting to a considerable degree of obstruction in the capillaries, and to a decided obstruction of the circulation from the right to the left side of the heart through the lungs, with a general congestion of internal organs, various means have been suggested and practiced. Any course which will contribute to the first indication—that of arousing the nervous organic energy—will do much to accomplish this; but there are other means acting more directly in effecting this object, among which is blood-letting.

This may seem a desperate remedy, and certainly should be used with the greatest discrimination and caution. There is, however, much testimony in its favor entitled to the highest respect, and my own experience enables me to express the opinion with confidence, that there is a class of cases occurring in the robust and vigorous, marked by a degree of hardness of pulse, by a violence of pain and cramp, without very free discharges, where, at the proper time—the early stage of congestion—duly aided by other means, and these, perhaps, stimulants, it will operate most beneficially. McIntosh has long since shown, and his observations have been abundantly confirmed, that bleeding, in the congestive or cold stage of intermitting fever, affords the greatest temporary relief, and would be generally indicated in the cold stage of the ague, were it not for the more remote consequences, the continued debility and impoverishment of the blood which would follow.

I have resorted to bleeding in cholera only in a small proportion of cases, as the large majority of those I have treated in the disease have been foreign emigrants, debilitated from recent sea voyages, or others whose vital powers were low; but whenever I have practiced it under

the circumstances described, I have been pleased with the result. The cramps, pains, blueness, and oppression of breathing have been relieved, and all the symptoms have taken a milder form.

Another means for the relief of this congestion in cholera, less hazardous in its effects, is the use of dry cupping. The cups should be applied along the spine and over the abdomen. A large cup or common tumbler suddenly applied over the stomach will often produce a marked effect in allaying the nausea and vomiting, and enabling the stomach to retain medicines until they can make an impression.

Nearly akin to this and to blood-letting, combining in some degree the advantages of both, and avoiding some of the disadvantages of the latter, is the ligation of the extremities, near the trunk, thereby detaining for a time a portion of the blood in the vessels of the limbs, and when the necessity for its detention has passed by, allowing it to return into the general circulation. Whether the blood may not be deteriorated by this detention, so as to be in danger of unpleasant effects, has often suggested itself to me, but I have not been able to discover evidence that this is the case, and if it be not, this plan must possess some advantage over blood-letting. I have practiced it frequently and with satisfactory results. Besides the general effects, it often relieves in a marked degree the cramps in the limbs thus treated. Sinapisms, frictions, external warmth, and other modes of cutaneous irritation, directly conduce to the relief of congestion, and sometimes act beneficially in arousing nervous energy.

Quinine has already been referred to as being useful in fulfilling the indication of arousing and sustaining the nervous energy; and by this mode of its operation, or in a more direct manner, its action tends decidedly to remove internal congestions—to equalize and free, as it were, the restrained and obstructed circulation. It thus becomes a means, and a most powerful one, of answering the indication of regulating the deranged circulation upon which so many serious consequences depend. Though I have no knowledge of its having been used hypodermically in cholera, I should have no hesitancy in injecting a solution of it into the areolar tissues where the indication for its use was present, and the stomach was not able to retain and absorb it. It might thus be given in the stage of the most active vomiting and purging, and probably would act as beneficially in this as in other stages of the disease. That it has an immediate effect in relieving the symp-

toms of congestion in malarious fevers, and that too, perhaps, independently of its antiperiodic influence, is quite certain—and the analogy between the congestive state of a malarious fever and the algid condition of cholera is quite apparent. At all events, whatever the mode of its action, whether by sustaining the nervous energies, or by some other means, more directly relieving the system of capillary, pulmonal, or general visceral obstruction and congestion, or by some peculiar antidotal influence neutralizing the effects of the cholera poison, as this article seems to neutralize the poison of periodic fevers, it has a decided beneficial effect in the disease, and after the stomach is quieted by opium, and very probably before, if used hypodermically, the chances of recovery are decidedly enhanced by the administration in divided doses of from a scruple or half a drachm to a drachm of quinine. Where much opium has been given, it enables the system to bear that article better, preventing to a considerable extent its depressing effects.

As cholera prevailed in Chicago, particularly in 1854, its cause was mingled with the malarious poison, and as in the case with various other diseases in the West and South, the cholera was modified by malaria, and, in most of the cases, assumed more or less of a periodical type. A patient seized with a malarious chill when the cholera poison was present and acting upon the system, would have that chill merged into the phenomena of cholera.

Profuse vomitings and purgings of a serous fluid, accompanied with cramps and other phenomena strikingly resembling genuine cholera, not unfrequently occur in malarious fevers when no epidemic cholera influence is present; and when such cholera influence prevails, the occurrence of the phenomena of fever will very often *precipitate a cholera attack*, and though the symptoms for the time being are controlled, they will recur with increased violence with the reappearance at another paroxysm of the fever—the weaker affection becoming merged in the stronger. In all such cases, *a full anti-periodic quantity of quinine is an absolute necessity*, and here certainly from half a drachm to a drachm, in divided doses, must be promptly introduced into the system, the whole being given some time before the period for the recurring paroxysm, which must be presumed to take place in twenty-four hours. The type may be tertian, but as this cannot be known beforehand, and the return of another paroxysm would be likely to

be fatal, action must be taken as though it were quotidian. *A recurrence must be prevented.*

The importance of quinine in such cases is measured by the difference between success and failure—between the life and death of the patient. There is here the imperative indication of interrupting the malarious paroxysm, which the quinine will do, but at the same time it fulfills the other indications before referred to.

If these views are correct, and of their correctness I have the most abundant reasons to be assured, no language can be too strong in urging them upon the attention of the profession. The malarial influence is by no means confined to the West and the South. In various localities in the Middle and even Eastern States, Intermittent and Remittent fevers, more or less perfectly marked, have a considerable prevalence, and the malarious poison, in sufficient quantity to modify other diseases, is still more widely diffused. Quinine is exceedingly important in the treatment of cholera everywhere, but is *peculiarly* and *inexpressibly* so in all those cases mingled with, and influenced by the malarious poison.

To correct that condition of the blood which arises from deficient respiration, and from a loss of its watery and albuminous portions, and its salts in the discharges, free, full inspirations of the freshest air must be encouraged, and a solution of common salt and bicarbonate of soda may be given, when the stomach will, without inconvenience, retain it; and chicken broth or beef tea, well salted, must not be omitted. The chlorate of potash is another article which, on chemical principles, and from its analogous effects in other diseases, would be suggested; but I have no experience with this salt in cholera, and can therefore only suggest its use.

Saline solutions have not only been given by the mouth, to correct these conditions of the blood, but they have likewise been injected into the veins; and in this, the object aimed at is commendable; but the operation of injecting the veins is a delicate and dangerous one, even under the most favorable circumstances of superior apparatus and skillful hands, and cannot be adopted with benefit in general practice. Its effects have been only temporary.

We have now passed over the leading indications in the treatment of cholera, and have referred in somewhat general terms to the principal means by which those indications are to be fulfilled, and it now

remains to attempt a more particular account of the details of procedure—of the particular stages and conditions indicating particular remedies and combinations, and the dose and timing of each article or compound applicable to the various conditions which occur. In doing this, it will be necessary to refer again to the different remedial agents just considered, and something like repetition cannot be avoided; but it is better that many things be repeated, rather than to fail in giving a distinct idea of the treatment to be pursued. It is not easy to combine in the same train of remarks the pathological and therapeutical principles involved, and the minute details of procedure.

In an active and severe case of cholera, the disease passes through so many stages in so short a time, and these stages are so variable in their duration, and each requires such modifications of treatment, that the patient, in order to be skillfully managed, must be visited very frequently—the amount of medicines taken and retained, and every symptom and condition must be particularly enquired into, and if the memory be at all treacherous, should be carefully noted down. The nurses must be faithful and sensible, and must have the most definite and explicit instructions in every particular. The physician must be cool and collected, and must have every faculty of his mind fully awake and concentrated upon the work. He who cannot come up to these requirements, who has not the health, or the vigor, or the courage—who has not indomitable perseverance and sleepless vigilance, and who, moreover, has not some definite ideas of the proper treatment, and some confidence in remedies, will consult his own peace of mind, and the interests of community, by avoiding, as some do, the treatment of all cases of this disease.

When, during the prevalence of epidemic cholera, a patient is affected with the premonitory symptoms of the disease, and especially if diarrhoea be present, he should immediately be sent to bed in a comfortable and well ventilated room, with warm cover, adapted, however, to the temperature. The state of the skin should be enquired into, and if not in perfect condition, as regards cleanliness, a warm bath, or sponging with warm soap and water, or saleratus water should be used. A powder, consisting of from one to three grains of *opium* with the same amount of *camphor*, well triturated with sugar, (or the equivalent of this powder in laudanum and spirits of camphor,) should be immediately given, and if the discharges are inclined to be watery, colorless,

and destitute of bile, from two to six grains of calomel or its equivalent of blue pill, must be added. This dose must be repeated in from an hour and a half to three or four hours, if the discharges are not completely arrested, and the sensations of abdominal uneasiness removed. After, from eight to fifteen grains of calomel are given, unless the symptoms assume considerable severity, this article may be omitted, but the opium and camphor must be continued until a decided narcotic influence is produced, or until all symptoms of the diarrhoea are removed. Should the diarrhoea not yield readily, acetate of lead or tannin should be added to the opium, in from two to four grain doses; or what is still more effectual, enemata of ten grains of the lead with a teaspoonful of laudanum in three or four ounces of some simple fluid, plain water answering every purpose, at a temperature a little above that of the room, must be given and repeated once an hour, or oftener if not long retained, and if the discharges are not arrested. In many cases, a few grains of quinine (two, three or four) given at first with each dose of the opium, will cause the latter article to be borne better, and the combined effect will be an improvement upon that which will be produced without the quinine. I have often prescribed pills, containing sulph. morphine one-fourth of a grain, and sulph. quinine two or three grains, one to be taken immediately, and repeated once in from one to four hours as may be required; and these doses in a majority of cases will be quite sufficient to arrest all the symptoms. The quinine may be continued until a scruple or sometimes more has been given. Mercury, however, should not be omitted where any considerable severity of symptoms exists, and where the cholera tendency is manifest in the colorless condition of the discharges; for, though without the mercury the symptoms may be arrested, they are much more liable, after a few hours, to return when this article is not used. Where mercurials, however, are used with opium, such returns of the symptoms are exceedingly rare. When, by these means, the discharges are completely arrested, the next day a mild laxative of syrup of rhubarb, or of equal parts of the syrup and tincture of rhubarb, or castor oil, with a few drops of oil of turpentine and tinct. opium, may be given with advantage. A simple opiate should follow ist operation, if there be pain or a tendency to a continuance of the catharsis. At the commencement of the treatment, or any time during its course, a sinapism to the abdomen may be useful.

The blandest diet should be insisted upon, and the patient kept quiet until restored. These means are almost as certain to arrest the disease, if resorted to and persevered in, as quinine is to arrest an ordinary attack of intermittent fever.

When the cholera is prevailing, physicians should strongly advise those who depend upon them for medical directions to keep about them medicines adapted to the disease, and should give them instructions respecting their applications, in case of emergency; but still, the rule should be to send for advice as soon as possible after symptoms appear. Many lives may in this manner be saved.

But the premonitory stage is sometimes absent, or so slight as not to receive attention, and is frequently so neglected, or so short in duration, as not to become the subject of treatment, and the case passes into the second stage—the full development of the active disease occurs before aid is sought. In the early part of this stage, before the deep blueness occurs, and while considerable warmth is present, especially if the disease seems to be of a forcible character, with severe pain and spasms, the treatment may commence by a moderate bleeding, or safer, by ligation of the extremities, detaining in that manner a portion of the blood from the circulation. Several cups may be applied over the stomach and abdomen; all drinks, in larger quantities than just sufficient to wet the passages, must be instantly and peremptorily prohibited, and, whether the preceeding means be used or not, the following powder administered in a teaspoonful of water:

R Opium,	grs. ij.
Gum camphor,	grs. ij.
Calomel,	grs. ij. to vj.
Sugar of milk,	grs. xv.
M. Triturate very thoroughly.	

The minute division of the medicines by trituration, I regard as very important. Here the sugar of milk is preferred to common loaf sugar, though the latter will answer. All the ingredients, when thus treated, will diffuse themselves readily, and will be extensively and speedily applied to, and will readily act upon, the stomach,—while, if the opium and other articles be given in pill or coarser powder, they will be much more liable to be rejected before they have time to act, or if retained, their effects will be more slow and cumula-

tive, and that of the opium may be too profound at a later period, when a powerful narcotism will be liable to be fatal.

If the treatment be commenced at a *very* early period in the second stage, and the circulation and respiration are still comparatively good, a quarter of a grain of morphine may be added to the first dose of the above powder. If there be evidence of matters upon the stomach not rejected, or if there be much cramp and retching, without the power of free emesis, an emetic dose of salt and mustard, or of sulph. of zinc, may precede the administration of the powder, and in that case, the temporary calm after vomiting must be seized upon to give the powder. When the vomiting is spontaneous, the calm succeeding it is the most favorable moment for administering a dose. When the dry cups come off, they must either be reapplied, or the regions of the stomach and bowels be covered with a strong sinapism. Sinapisms may also be applied to the extremities. If the first powder be rejected before it has had time to make an impression or be absorbed, another should be immediately given, omitting the morphine, however, in the second dose, if the first was retained as long as ten or fifteen minutes, or if there is evidence of any portion of it having been retained, and after the second dose, it is not usually safe to add morphine to the two grains of opium, however frequent the vomiting may be. These powders may then be continued, sometimes varying the proportions by increasing the calomel and diminishing the opium, repeated in once from *one to three hours*, according to the severity of the symptoms, *until either the discharges are arrested, a perceptible degree of anodyne and narcotic influence is produced, or the blue stage occurs.* After one or two doses of the powder are given, and the vomiting is somewhat abated; and especially if the treatment had commenced at a later period of the disease, three or four grain doses of quinine should be administered once in one, two, or three hours, until a scruple, or half a drachm, or more has been given. Should the discharge be arrested or very materially abated, as they usually are after a short time under this treatment, the stomach will be in a condition to retain other articles, and other indications besides that of arresting the discharges can be attended to. Should a considerable degree of narcotism be present, a strong infusion of coffee must be given liberally, and continued until the symptom is no longer sufficient to excite uneasiness. Should there be much depression, carbonate of ammonia may be added to the quinine, or given by itself,

and should the surface be dark, with considerable depression of the vital powers, common salt and the flour of mustard, in doses of from ten to fifteen grains each, may be given once in from one to two hours. At the same time, a few spoonfuls of chicken broth or beef tea, with rice water well salted, may be given quite frequently, say every half hour. In the meantime, some fifteen to thirty or more grains of calomel have probably been given in the powders, and if so, no more will usually be required; but if rice water discharges still occasionally continue, five or six grain doses of this mineral may be continued without the opium, or with a quantity of it so small as not to be incompatible with the safety of the patient. The extent to which the opium may be safely carried, cannot be defined, and must be carefully judged of in each case by all the lights which close observation and experience can afford. If the treatment be commenced later in the disease than we have been supposing, opium must be used more sparingly, and as the point at which treatment has been commenced advances toward or into the blue and collapsed stages, less must be used, until none can, with safety or a prospect of success, be given.

Acetate of lead, in from two to four grain doses, may sometimes, perhaps, be beneficially given alternately with the opium, calomel and camphor powders, especially if the purging be out of proportion to the vomiting. But the stomach has certain capacities for the enduring of medicines, beyond which, it cannot be plied with impunity. We cannot pour promiscuously into that organ, when irritated as in this disease, every article for which there seems to be an indication; and according to my observation, when acetate of lead, by the stomach, has been added to the treatment just described, the effect has not *usually* been so satisfactory as without it. In the condition, however, above referred to, when the purging is more severe than the vomiting, and continues after a partial calm has been effected by anodynes—or in the latter and lower stages of the disease, when this exhausting discharge continues—the effect of *enemata* of the lead, given as directed when describing the treatment of the premonitory stage, with such quantities of laudanum as may be borne, can scarcely be too highly praised. Tannin may be used as a substitute for the lead,—is often quite as effectual, and, not unfrequently, is borne better by the stomach when used in that way. I have not unfrequently combined tannin with quinine, where the latter article was indicated, and purging was

present, without producing unpleasant effects on the stomach, and with a manifest impression upon the purging.

The above course of treatment, when commenced *before the blue stage has thoroughly set in*, will, according to my observations, in a very large proportion of cases, I should say, in fair constitutions, in nine cases out of ten, succeed in arresting the disease, and procuring a favorable reaction. The after treatment should be simple.

I am aware that this statement of the success of this treatment is much more favorable than is usually found in the standard works, respecting any mode of treating this formidable disease. For this reason, the statement is made with some degree of hesitation, and not without due reflection. But a careful review of my own experience, fully justifies it. It will be observed that the statement is not, that nine out of ten of the cases of cholera, as usually met with in practice, can by any means be saved, as frequently the disease, when the physician is first called, will be so far advanced as to be beyond the reach of any treatment; and occasionally a case will be so rapid and severe, as to resist the most prompt and timely measures; but in ordinary cases, in persons of fair constitution, the premonitory diarrhoea occurring, and the full attack developing in the usual manner, if the treatment be commenced before the blue stage has supervened, and be followed up with promptness and skill, an exceedingly large proportion of cases will recover.

If the bowels are not open after twenty-four or thirty-six hours from the period of reaction, a gentle laxative of castor oil, with the addition of small quantities of oil of turpentine and laudanum, or an aperient of some of the preparations of rhubarb, in divided doses, may be given. If the stomach seems loaded, as it not unfrequently is at this period, with bile, a gentle emetic of salt and mustard will sometimes procure great relief. If the urinary secretion is not soon restored, or indeed in anticipation that it may not be, when the stomach and bowels become quieted, spts. nit. dulc. may be given in half teaspoonful doses in water, frequently repeated. Bland nourishment and drinks may be allowed, and the patient kept quiet. Sometimes gentle tonics may be useful.

In some rare instances, after not very severe cases of cholera, but rather more frequently after the graver cases, the kidneys fail entirely to perform their functions, and the patient dies comatose from the poison of

urea in the blood. Death usually occurs in from twenty-four to forty-eight hours after reaction; and, according to my observation, when the suppression of the secretion is complete, and the comatose symptoms strongly resembling those of an over-dose of opium, supervene, no means within my knowledge will avert the fatal result. I have tried various stimulating diuretics, electricity, counter irritation over kidneys, and catharsis.

Where mercurials have been pretty freely used, and alcoholic stimulation has been avoided, it is seldom that severe congestions and inflammations of the brain and other organs occur, after attacks which have not passed into the collapsed stage. Whenever these cases do occur, however, treatment must be conducted on general principles, bearing in mind that though there be inflammation, it occurs in a system much debilitated by a severe disease. If the brain and spinal marrow, and their envelopes, be the seat of the disease, blisters, mercurials, and iodide of potassium would be indicated. If the stomach and bowels be the seat of the inflammation, blisters, a few minute mercurial doses, with small doses of morphine, followed, perhaps, by a mild laxative of castor oil, and this succeeded by the following mixture will be well:

R.	Oil of Turpentine,			
	Tinct. of Opium,	-	-	aa. f. 3 ijss.
	Gum Arabic,			
	Sugar,	-	-	aa. $\frac{7}{3}$ ss.
	Camphor water,	-	-	f. $\frac{7}{3}$ ij.

M. For an emulsion. A teaspoonful once in three or four hours.

These secondary symptoms are varied and sometimes protracted, requiring a variety of management, often embracing ultimately a general tonic course.

But cases of cholera are frequently not seen until they are far advanced into the cold or blue stage, or have actually passed into the collapsed condition.

While the pulse remains at the wrist, there is sufficient hope to demand strenuous efforts, and even after it has disappeared, patients occasionally recover. The practitioner of close observation, of acute discernment, and of much experience in cholera, will be able almost at a glance, to determine the probable fate of his patient, for there is a

discernible point, beyond which if he pass, all the chances are against his recovery.

If bordering upon the full collapsed or asphyxiated state, opium, as has already been stated and repeated, must not be given, or only in very small quantities. If the purging still continue, an enema of a solution of acetate of lead, (fifteen or twenty grains) with perhaps a teaspoonful of laudanum, may be used and repeated, with or without the laudanum, as circumstances may require. The cold affusion, or the rubbing in ice, may here be tried, followed by warm frictions, sinapisms and warm blankets. The fullest inspirations of the freshest air may be insisted upon, and quinine, warm coffee, and carbonate of ammonia, two or three grains of the latter, and the same amount of the, quinine, once an hour or two, alternated with doses of from ten to fifteen grains each of salt and mustard, may be given, not omitting the frequent administration of chicken or beef tea, well salted.

The chlorate of potash would here be suggested as possibly supplying oxygen to the blood and improving its condition in other respects, and quinine if not well borne or appropriated by the stomach, may be tried *hypodermically*. These means used in this manner, as already stated, I have not tested by experience, but they are strongly suggested on rational principles, and I should not hesitate to give them a trial. Dry cupping along the spine may be added to the treatment with advantage. Besides these means, six or eight grains of calomel should be given once in an hour or two, until some twenty or more grains are used; not with reference so much to any immediate effect, as to act after several hours upon the bilious secretion, should the vital powers be kept up for that length of time; for, without that action upon the liver, the cholera discharges are liable to continue or return.

The use of opium in cholera so essential for the arresting of the discharges, and yet so liable when freely used, to interfere with the function of respiration, and produce other injurious effects especially in the later stages of the disease, is of the utmost interest to the physician who expects to meet with this affection; as the chief element of his skill in treating the disease, will consist in his judgment and tact in the administration of this article. There is on the one hand the Scylla of allowing the intense irritation, and profuse discharges to so alter the proportions of the constituents of the blood, and exhaust the patient, as to carry him beyond hope, and on the other hand the Charybdis of

too great narcotism, interfering with respiration and other functions, to an extent equally dangerous. It requires skill and tact to steer between these rocks of destruction; and in treating cholera, this passage must be made.

Of the treatment of the fully collapsed state, I have little to say. I have seen a few such cases recover—that is, cases where the pulse could not be felt at the wrist, and where the loss of voice, the blue and shrunken condition of the surface, the extreme sunken and lustreless eye, and the slow laborious breathing, corresponded with the arrested condition of the arterial circulation; but these are exceptions so rare, that the influence of treatment is not ascertained.

Some of the most remarkable recoveries of this kind which I have witnessed have been after large and repeated doses of calomel; but of its manner of producing beneficial effects, or indeed of the fact of its producing any effects at all, I am by no means satisfied.

In describing the treatment of the active or vomiting stage of cholera, it was mentioned that drinks should be avoided excepting in tea spoonful doses, or quantities just sufficient to moisten the mouth and throat, and the subject is again introduced here in order to make it more prominent. This I regard as an essential item of treatment in most cases. The objection to the drinking is, that while fluids in considerable quantities are taken into the stomach, vomiting will continue, and medicines will not be retained. A teaspoonful of ice water, or a very small piece of ice may be taken frequently, and will answer all the purposes of quenching thirst, of a larger quantity. So important do I consider this point, that I would not take the responsibility of a case—would abandon a patient whose friends would not enforce the restriction, where vomiting or the danger of vomiting existed.

Time is so essential in the treatment of cholera, that it is very important that every practitioner have about his person several articles of medicine; and particularly if the powders of opium, camphor, calomel, and sugar, which I have recommended, be used, they should be carefully prepared, of good materials, thoroughly triturated, and put up in packets, accurately weighed. In a large practice much time and many lives may be saved by such precaution.

The views of cholera and its treatment expressed in the preceding pages, are, as already intimated, the result of no small amount of experience (about two thousand cases of the disease during three seasons

having come under my careful observation, and management) and they are presented to the profession with much confidence in their correctness. The fact is not forgotten that diseases however specific in their character, are modified in many in their features, and particularly in their severity, and the influence of remedies upon them, by local circumstances, and what is called the "prevailing constitution of the atmosphere." It is quite possible that farther experience in other cholera epidemics, or in different localities, would modify my views as to the selection and efficacy of remedies, but until other and clearer light is thrown upon the subject, and other measures are shown to be more effectual, the course indicated would be pursued with a firm conviction of its being the one most worthy of approval in the present state of our knowledge. If the disease as it may hereafter appear, shall not differ in its features from those presented during the three years of its prevalence in Chicago, similar results from treatment would confidently be expected to follow. The cases treated were too numerous, were spread over too large a period, and were too frequently compared in their results with those occurring in the same localities and under similar circumstances, but differently managed—the whole series of observations were too carefully made, not to have the conclusions drawn from them held with firmness.

The great desideratum in the treatment of cholera, is some means which shall answer an indication above those we now labor to fulfill—that of directly and certainly neutralizing the cholera poison. The present state of pathological and therapeutical science strongly points to the discovery and application of antidotes to specific poison; and may we not hope that in the advancement of science, the hidden nature of the cholera germ will be revealed, and a remedy be found which will directly and surely destroy its effects? He who shall be so fortunate as to make this discovery, must ever be regarded as among the great benefactors of mankind; and in celebration of the triumphs of medical art his name will be associated and pronounced with those of Harvey and Hunter, and Jenner.

