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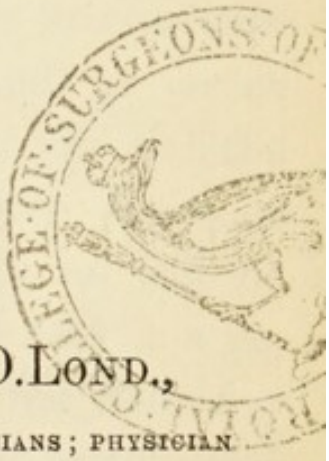

BY

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PREFACE.

My object in this publication has been to condense within a few pages an intelligible, and, so far as is possible, a correct account of the nature and the appropriate treatment of the pestilence which is now rife amongst us. The pamphlet, as will be seen, consists of two parts. The first part is a reprint of an article which appeared in the *Saturday Review* on the 2nd June. I have here republished it, with the permission of the author and the editor, because I believe that it contains within a small compass the most lucid account of the nature and treatment of cholera that has yet appeared. The article was written by a physician of the greatest authority and eminence; one who, as a writer and a practitioner, stands second to no one in the profession. A medical journal, referring to this paper, said of it, "As a model of what medical writing should be, we recommend it as worthy of all consideration."

A careful perusal of that part of my pamphlet will prepare the reader to understand the second

part; in which I have given, in some detail, plain directions for the prevention and treatment of diarrhœa and cholera. In giving these directions, I have endeavoured to act upon the golden rule which should always guide us in the treatment of disease —NE QUID NIMIS; not too much of anything, however good it may be in itself.

It will be seen that I have no specific cure for cholera; that I have no infallible remedy or method of treatment; and that my chief endeavour has been, while avoiding all violent means and all mischievous medication, to make the treatment of cholera conformable to what is known of the nature of the disease, and of the natural method of cure. For in this, as in many other acute diseases, there *is* a natural curative process; and the highest art of the physician consists in learning, with respect to each disease, what that process is; so that he may be enabled to assist, and, if need be, to regulate it, while he carefully avoids all such means as tend directly to repress or to oppose the curative efforts of nature—"the physician within the skin."

11, Savile Row, July 1866.

EPIDEMIC DIARRHŒA AND CHOLERA.

PART I.

THE NATURE AND TREATMENT OF CHOLERA.*

[*It will be seen that the article here reprinted from the "Saturday Review" consists of an analysis and a review of a work on Cholera by the Author of this pamphlet.*]

THE cholera is once more threatening to take possession of this country. Latent or declared, it lands at Hull, crosses from the east coast of the island to the west by railway, and all but establishes itself at Liverpool. It seems but too probable that before autumn has come and gone the pestilence may be rife in London and in many of our cities and towns. Are we better prepared for defence against this, its fourth invasion, than we were against the three that have preceded it? Are our foul places purified, is our drainage less imperfect, are separate

* "Notes on Cholera: its Nature and its Treatment. By George Johnson, M.D.Lond., Fellow of the Royal College of Physicians; Honorary Fellow of King's College, London; Professor of Medicine in King's College; Physician to King's College Hospital. London: Longmans and Co. 1866.

hospitals ready for the reception of those upon whom the malady may seize, has provision been made for a room-to-room visitation of the houses of the poor? To these questions our sanitary authorities may or may not be able to give a satisfactory reply. There remains another, of vital importance. Has any new and more hopeful method of dealing with this fearful disorder, when present, been suggested? To this the little book before us professes to give a very encouraging, because an affirmative, answer.

Of remedies—by which are here meant sanative measures rather than particular drugs—it is required that they square with the nature of the disorder, and that this fitness be certified by their success. The popular, which is also presumably the true, notion of the cause of cholera ascribes it to the influence of a material poison upon the tissues and functions of the human body. Speaking generally, there are profuse discharges of a peculiar fluid from the stomach and bowels, painful cramps of the muscles, rapid wasting, and what is called collapse, which is characterised by a cold and blue skin, coldness even of the tongue and of the breath, a husky voice, a vanishing pulse, a corpse-like aspect, and, in most cases, early death. The popular explanation of this series of symptoms is of this kind. The drain upon the body by the intestinal discharges deprives the blood of its most fluid ingredients, rendering it thick, like treacle, and incapable of passing freely, if at all, through its natural channels;

and thus, the circulation coming ultimately to a stop, life stops also. Consistently with this view of the disease the proper remedies would be such as are calculated to restore animal warmth, to sustain or force on the flagging circulation, and, above all, to arrest that flux of watery or serous material to which the other symptoms, the coldness, the thickening and stagnation of the blood, and the imminent danger to life, have been plausibly attributed. And the drugs most likely to bring about these ends would be alcoholic stimulants, such as brandy, astringents, and opiates, aided by the application of external heat. Upon similar grounds the dilution of the thickened blood by warm water injected into the veins was recommended, and has been practised with marvellous though very transient good effects. Here the theory of the morbid conditions and the remedies applied are indeed conformable to each other; but the result has been very disappointing. The test has given a negative and rueful response.

The history of the operation of most poisons is this. They enter the body, are distributed by the blood, which they often greatly alter and spoil, and (in virtue of that *vis medicatrix naturæ* which the ancients believed in, which was scouted by a later school of physicians, and which is now-a-days re-asserting its reality and value) are discharged as fast as possible through some of the natural drains or outlets of the body. If the vital movements can be kept up till this process of expulsion is complete, and there has been no permanent damage of vital

parts, the poisoned man recovers. The bearing of this accepted doctrine upon the proper treatment of cholera is obvious. The abundant discharges, which in this country it has hitherto been the aim of the physician to check or stay, are really evidence of the effort made by the natural powers to extrude the poison. To restrain them is to pen the poison and its products within the body, to fight against the conservative forces, and to do what art can do to ensure thc mortal agency of the poison. So far from striving to stop the discharges by opiates or by directly astringent drugs, it is always right to permit, and even to encourage, and it may sometimes be expedient to promote, them. This is the substance of the new or revived method of treatment which the cholera is affirmed to require. The theory of the disease corresponds with the theory of its cure; and the upshot is believed to be amply confirmative of their truth. But this matter needs and deserves a little further unfolding.

In the epidemic of 1854, Dr. George Johnson, the Professor of Physic in the Medical School of King's College, mortified and disheartened by the ill-success of the practice then generally followed, resolved, after investigating afresh the phenomena of the disease, to make trial of another and opposite —in one word, of the evacuant—plan; and in no long time he was able to lay before the "Treatment Committee" of the General Board of Health, then sitting, a statement showing a comparatively small mortality under a series of attacks in which almost

the only drug employed was castor-oil. This method ran, however, so counter to the current prejudices that it found no favour with the Committee; and a carefully written volume on the subject, published by him in 1855, attracted little or no attention. The pest was gone or just going from among us, and the alarm and the interest it had excited departed with it. Since that time his convictions have been strengthened by further study and reflection; and his matured views are briefly but clearly set forth, and very ably vindicated, in the small work now under our review. They claim the most serious consideration.

Dr. Johnson shows that the evacuant plan, so far from being new, was first adopted, with favourable results, nearly half a century ago, by English practitioners in India; its professed object being that of getting rid of offensive morbid secretions. He combats the prevalent notion "that the worst symptoms are due to the drain of fluid from the blood," and brings evidence of various kinds to prove that this theory is inconsistent with the acknowledged facts of the disease. He remarks, in the first place, that the alleged cause bears no direct proportion to the effect which is assigned to it, as it must do if the theory were true. It is even affirmed by the most exact observers, that the relation between them, if any, is rather an inverse relation; that the severest and most intractable cases are those in which there is little or no discharge from the alimentary canal. To quote one only of the highest of

these authorities: "It may confidently be asserted," says Dr. Parkes, "that there is no one who has seen much of cholera who does not know that, exclusive of the mildest forms of the disease, a case with little vomiting or purging is more malignant and more rapidly fatal than one in which these are prominent symptoms." It is a significant fact, telling in the same direction, that in cases of recovery, while the collapse is passing off, the vomiting and purging do nevertheless continue.

In truth, the supposed analogy between the collapse of cholera, in which is included almost the whole danger of the malady, and the state of body (for brevity's sake let us call it exhaustion) which is produced by an excessive drain of serous fluid from the blood, is a mistaken or false analogy. In one point, the tenuity and weakness of the pulse, the two may seem to touch each other; in all other points they differ widely. A person exhausted by loss of blood, or by a long continued drain upon that fluid, is in a state that is very near to syncope. When the exhaustion is extreme, if he assume the erect posture he faints outright, and becomes unconscious. To walk, or stand, or even to sit up, is simply impossible; whereas, in the collapse of cholera, syncope is well-nigh unknown. The patient, with death stamped apparently upon his features, with no pulse to be felt at his wrist, with a blue and icy-cold skin, is not faint, but able to walk about the room, and to perform many of his usual functions. The exhausted man, if he recover, recovers slowly;

the repair of his impoverished blood is necessarily a gradual process. The cholera patient rallies from his collapse at once, if at all. He may be in full collapse to-day, and convalescent the day after to-morrow, and apparently but little weakened by the terrible disorder through which he has so recently passed. "I have seen (says Mr. Grainger) a man stand at his door on Wednesday who on Monday was in perfect collapse." Again, the way in which remedies tell upon the two contrasted conditions is totally and instructively unlike. The coldness and faintness of exhaustion are relieved at once by a glass of wine or brandy: the pulse instantly acknowledges the virtue of the stimulus. But alcoholic stimulants do not warm or invigorate, even for a moment, the patient in choleraic collapse: rather they seem to make matters worse. On the other hand, blood-letting has often brought marvellous relief under collapse; while to draw blood from a patient who is fainting from exhaustion would probably ensure his death, and would certainly aggravate his danger. In illustration of the effect of venesection, Dr. Johnson quotes the following case, recorded by Sir Ranald Martin:—

"On visiting my hospital in the morning, the European farrier-major was reported to be dying of cholera. I found that during the night he had been drained of all the fluid portion of his blood. His appearance was surprisingly altered; his respiration was oppressed; the countenance sunk and livid; the circulation flagging in the extremities. I opened a

vein in each arm, but it was long before I could obtain anything but trickling of dark treacly matter. At length the blood flowed; and by degrees the darkness was exchanged for more of the hue of nature. The farrier was not of robust health, but I bled him largely; when he, whom not a moment before I thought a dying man, stood up and exclaimed, 'Sir, you have made a new man of me.' He is still alive and well."

Dr. Johnson puts the natural question, "Is it possible to reconcile facts of this kind with the theory that the collapse of cholera results from a loss of the liquid constituents of the blood? If Sir R. Martin's hypothetical statement that his patient 'had been drained of all the fluid portion of his blood' were an accurate expression of facts, can we conceive it possible that he could have 'made a new man' of him by abstracting largely the blood which remained in the vessels?"

What, then, is the explanation of the symptoms of collapse, if they be not owing to a drain upon the blood? Dr. Johnson's view of this matter is quite original, highly ingenious, extremely interesting, and most ably supported. He tells us what are, unquestionably, the anatomical characters of that condition; the state, that is, of the internal organs as revealed after death under collapse—and they are very remarkable. The left chambers of the heart, which naturally receive, to transmit onwards, through the arteries, the blood that is traversing the lungs, are found to be nearly empty; while the

right chambers, and the great bloodvessel which conveys the blood towards the lungs, are gorged and distended by black blood. Following this vessel, called the pulmonary artery, into its subdivisions, they also are found to contain blood of the same dark colour. But the ultimate tissues of the lungs themselves appear unnaturally pale and bloodless. The stream of blood has obviously suffered arrest in the small arteries, just before it reached that wonderful network of minute channels which, being neither arteries nor veins, but intermediate between the two, are called capillaries. It is in these that the vital changes of the body are mainly transacted. We wish we could place before our readers the figured illustration of these facts which is prefixed to Dr. Johnson's book.

The question then is—Why has the circulating blood stopped here, and by what means has it been brought to a stand? Were the arrest of motion due to gradual thickening in consequence of the continued abstraction of its liquid portion, it would be found stagnating in the capillaries, as well as in the arteries. It must be borne in mind that one characteristic symptom of cholera—that symptom which, irrespectively of the fatality of the disease, renders it truly a disease to be dreaded—consists in very painful cramps of the larger muscles of the body. These contractions, it may be assumed, are produced by the choleraic poison, just as we know they are producible by the poison of strychnine. Dr. Johnson supposes that a

similar ,spasm or cramped state of the muscular fibres which embrace, and by their natural contractions regulate the size of, the minute pulmonary arteries, is caused by the same choleraic poison, and bars these slender channels against the advancing blood. The thickening of the blood is a consequence, and not a cause, of the collapse. Precisely in the same way does a similar condition of the muscular fibres of the smaller air-tubes of the lungs constitute a fit of spasmodic asthma.

Surely this seems a reasonable theory. It is founded on a true analogy; it is consistent with the symptoms noticed during life, and with the conditions discovered after death. We may, therefore, legitimately regard it, until fairly refuted, as a sound as well as a most ingenious and important theory. In truth, it derives strong confirmation from the fact that it unlocks, like the right key, the whole of the pathological intricacies of the disease. Thus the emptiness of the systemic arteries accounts for the extinction of the pulse at the wrist, for the cadaverous sinking in of the eyeballs and falling of the features, for the blueness and coldness of the skin, and for the absence of syncope. The circulation stops, not from debility of the heart, as in exhaustion, but in consequence of a direct mechanical impediment to the onward course of the blood. We can understand the impotence of brandy against this condition; and how, on the other hand, bleeding may help, both by relaxing the spasm and by unloading the distended right heart, to restore the

circulation. Into this explanation Dr. Johnson presses, plausibly enough, the singular effect of the injection of fluids into the veins of these patients. It appears that, to be influential at all, the fluids must be hot; and he concludes that they act chiefly by relaxing, through their warmth, the spasm of the smaller arteries. The blood then flows on again, and the symptoms of collapse are for a time removed. Again, the husky whispering voice is owing, not to muscular weakness, but to the small volume of tidal air in the respiratory currents. As but little venous blood reaches the lung tissue proper, there is but little demand for air to meet and decarbonize it. The respiration accordingly becomes shallow, and the vocal pipe, feebly blown through, refuses to speak. Under the temporary impulse of the warm injections, the voice regains its usual tone and note. Once more, there are chemical and less obvious changes which receive their explanation from this theory, and further attest its truth. The stream of blood through the pulmonary capillaries being greatly lessened, the supply of oxygen is proportionally reduced in quantity. Hence during the stage of collapse there is defective oxygenation of the blood and of the various tissues of the body, coldness and blueness of the surface, diminished exhalation of carbonic acid, and suppression, nearly absolute, of bile and of urine—the chief constituents of bile, urine, and carbonic acid being all results of oxidation. That this is the correct explanation of the suppression of bile and urine during collapse is

rendered all the more probable by the curious fact that, when a nursing mother becomes the subject of cholera, and falls into collapse, the secretion of milk continues unchecked. Now the chief constituents of milk—casein, sugar, oil, and water—may be obtained from the blood without the addition of oxygen.

If the doctrines advanced by Dr. Johnson be well founded, it must be wrong to dam the choleraic poison and its products within the body. Even when those products have, in one sense, been separated from the system, they may produce highly noxious effects if they remain shut up in the stomach or bowels. Admitting, as we must, on the testimony of trustworthy observers, that a minute quantity of the morbid excretions swallowed with water may suffice to produce the disease, a large quantity retained, through weakness of the expulsive powers or otherwise, can scarcely be harmless. Rather may we expect that its expulsion will tend to liberate the patient from danger and discomfort; just as the opening of large abscesses, and the discharge of foul pus and imprisoned gases, are often seen to rescue, as if by magic, a sick man from apparently impending dissolution. If we understand Dr. Johnson aright, he does not now, whatever may have been his earlier views, propose to excite discharges from the mucous surface of the digestive canal, so much as to facilitate the removal of matters lodged there, by emetics, by draughts of tepid water, or other diluents, or by castor oil, of which

the action is both speedy and gentle. The recommendation of the evacuant plan must, after all, lie in its comparative success, and its worth will doubtless be put closely to the proof if the disease should again become prevalent in this country.

The most plausible objection which has hitherto been offered to Dr. Johnson's teachings is the allegation that the diarrhœa, which is always very frequent during an epidemic of cholera, and which, in most instances, is really a mild form or an early stage of that complaint, yields most readily to astringent and opiate remedies; and that many cases which might otherwise run spontaneously, or be hurried by aperients, into fatal collapse, are thus nipped in the bud. The accuracy of both these statements is impugned by Dr. Johnson. Relying upon his own experience, which has been neither small nor carelessly gathered, and upon the corroborative testimony of not a few of his professional brethren, he affirms that both the duration of choleraic diarrhœa, and its tendency to pass into perilous collapse, are always less in proportion as the disorder is either left to itself, or discreetly handled with mild evacuant drugs. On this point, as on others, Dr. Johnson's facts and reasonings are well deserving of careful and impartial consideration.

PART II.

RULES FOR THE TREATMENT AND PREVENTION OF DIARRHŒA AND CHOLERA.

[*This Part is chiefly a reprint from an article of my own, in the "British Medical Journal" of July* 21.]

DIARRHŒA during an epidemic season is in many instances, though not in all, an early stage or a mild form of cholera; and in the great majority of cases of actual cholera, an attack of bilious diarrhœa marks the onset of the disease. A diarrhœa, when it is not the actual beginning of cholera, will weaken the patient, and so may predispose him to suffer from the more serious form of disease. *Diarrhœa, therefore, ought not to be neglected even for an hour.* That plan of treatment for diarrhœa is obviously the best which most speedily and completely puts a stop to the disease, without subsequent ill effects.

It may be stated as a general proposition, that the immediate cause of diarrhœa or looseness of the bowels is the presence of offending materials in the alimentary canal. These offending materials are of various kinds in different classes of cases. In one case, unwholesome and undigested food is the exciting cause of the purging; in another case, a

large and unnatural accumulation of the fæculent contents of the bowel; while, in another class of cases, noxious secretions are poured from the blood into the bowel, in consequence of the action of a morbid poison upon some of the ingredients of the blood. To this last class of cases belongs what is called *choleraic diarrhœa*.

The most reasonable theory of choleraic diarrhœa is, that a morbid poison enters the blood either with the air through the lungs, or with the food and drink through the alimentary canal; and that this poison excites certain changes in the blood, in consequence of which some blood materials are spoiled, and thus rendered not only useless, but noxious. These morbidly changed blood-materials are then discharged from the blood-vessels through the mucous membrane of the stomach and bowels, and are ultimately ejected by vomiting and purging.

Various as are the remote and primary causes of diarrhœa, this one condition is common to all classes of cases; viz., that the contents of the bowel are unnatural and offensive. These offending materials are the immediate cause of the purging; and they must be expelled from the bowel before the diarrhœa can come to an end.*

From the above considerations we deduce one important and guiding rule of treatment, which is this —*not to attempt by opiates, or by other directly re-*

* We need not here take into consideration those cases of diarrhœa which result from ulceration or other local disease of the bowel itself.

pressive means, to arrest a diarrhœa while there is reason to believe that the bowel contains a considerable amount of morbid and offensive materials. It is certain that these offending materials must be cast out from the bowel before the diarrhœa can permanently cease. The effect of an opiate at this stage is to prolong the disease, and to increase the risk of mischief, from the retention and reabsorption of the morbid contents of the bowel. If the opiate have the effect of retaining within the blood-vessels some of the morbidly changed blood-constituents, this astringent action will probably be more injurious and even deadly than the retention of morbid secretions within the bowel.

The purging is the natural way of getting rid of the irritant cause. We may *favour* the recovery by directing the patient to drink copiously any simple diluent liquid — water cold or tepid, toast-water, barley-water, or weak tea; and we may often *accelerate* the recovery by sweeping out the alimentary canal by some safe purgative, and then, if necessary, soothing it by an opiate. Castor-oil, notwithstanding its unpleasant taste, is, on the whole, the safest and best purgative for this purpose. It has the advantage of being very mild and unirritating, yet withal very quick in its action. A tablespoonful of the oil may be taken, floating on cold water or any other simple liquid which may be preferred by the patient. A mixture of orange-juice or of lemon-juice with water forms an agreeable vehicle for the oil. If the dose be vomited, it should be repeated

immediately; and the patient should lie still, and take no more liquid for half an hour, by which time the oil will have passed from the stomach into the bowels. Within an hour or two, the oil will usually have acted freely. Then a tablespoonful of brandy may be taken in some thin arrowroot or gruel; and if there be much feeling of irritation, with a sense of sinking, from five to ten drops of laudanum may be given in cold water. These means will suffice for the speedy arrest of most cases of choleraic diarrhœa. If the patient have an insuperable objection to castor-oil, or if the oil cannot be retained on the stomach, ten or fifteen grains of powdered rhubarb, or a tablespoonful of the tincture of rhubarb, or a teaspoonful of Gregory's powder, may be substituted for the oil.

If the diarrhœa have continued for some hours, the stools having been copious and liquid; if there be no griping pain in the bowels, no feeling or appearance of distension of the intestines; the abdomen being flaccid and empty, and the tongue clean—we may conclude that the morbid agent has already purged itself away. There will, therefore, be no need for the castor oil or other laxative, and we may immediately give the brandy in arrowroot, and the laudanum, as before directed. The rule in all cases is, *not to give the opiate until the morbid poison and its products have for the most part escaped; not to close the door until "the enemy" has been expelled.* While there are some cases in which the evacuant dose is not required even at the commencement of

the attack, there are many more in which the opiate is unnecessary in the later stage. In some cases of severe and prolonged diarrhœa, it may be necessary to repeat the oil and the laudanum alternately more than once, at intervals of three or four hours. Practical skill and tact are required to discriminate these cases. It must be borne in mind that when the choleraic secretions are being actively poured out from the blood-vessels, the bowel, though it may have been completely evacuated by a dose of oil, may quickly again become filled with morbid secretions, and hence the need for an occasional repetition of the evacuant dose.

If the diarrhœa be associated with vomiting, this should be encouraged and assisted by copious draughts of tepid water. The vomiting affords relief partly by the stimulus which it gives to the circulation, but mainly by the speedy ejection of morbid secretions.

If there be nausea without vomiting, and more especially if the stomach be supposed to contain undigested or unwholesome food or morbid secretions, an emetic may be given—either a teaspoonful of powdered mustard or a tablespoonful of common salt, or twenty grains of ipecacuanha powder in warm water.

Thirst may be allayed by drinking cold water, which may be acidulated by the addition of lemon-juice or a few drops of dilute sulphuric acid. *Care should be taken that the water for drinking is pure.* Organic impurities, such as result from the admix-

ture of sewage, are especially to be dreaded. If the water be of doubtful purity, it should be carefully filtered through sand and charcoal, and then boiled. Impure water is a common exciting cause of cholera.

While the diarrhœa continues, the diet should consist mainly of rice or arrowroot, gruel or broth, or beef-tea.

In all cases of severe diarrhœa, the patient should remain in bed.

If the purging continue, if the stools become colourless and watery (the purging being of the kind commonly called rice-water purging), and if the surface of the body become cold and blue, the disease is now passing, or has actually passed, into the stage of collapse.

This state of choleraic collapse results from a peculiar arrest of the flow of blood through the lungs, occasioned by a morbid poison. It is not a condition of mere exhaustion. It is not relieved by the remedies for exhaustion; and it is made worse by opiates and by spirituous stimulants, which must, therefore, be avoided. The patient should be strictly kept in the recumbent position; *he must not be raised even to go to stool.* He should be abundantly supplied with fresh air and should be allowed to drink pure water freely. The water may usually be taken *cold*, but it should not be *iced* except occasionally when given to check excessive vomiting. Large quantities of iced water may do harm, by chilling the patient and checking the natural eliminative efforts. In cases of extreme collapse I would

persuade the patient to drink *hot water*, for the purpose of warming the blood and quickening the circulation. Some care is required not to over-distend the stomach by liquid. Unless vomiting occur from time to time, the drinking of large quantities of liquid may so distend the stomach as to impede the breathing, and thus cause much distress.

Hot flannels, or bottles, or bags of sand, should be applied to the feet and legs.

Cramps may be relieved by rubbing the affected parts with the warm hand.

Hot baths, whether of water or of air, have been found to be, on the whole, more distressing and exhausting than beneficial.

Five grains of sesquicarbonate of ammonia, or a teaspoonful of spirit of sal volatile, may be given in an ounce of camphor mixture every two or three hours as a diffusible stimulant.

The discharges from the bowels, and the condition of the abdomen, should be carefully observed. The discharges always continue, more or less, during the stage of collapse and until reaction has set in. One of the earliest aud surest signs of reaction is the reappearance of bile in the vomited matters and in the stools. When vomiting and purging entirely cease during the stage of collapse, the disease is nearly always fatal.

One of the main objects of treatment during this stage is to facilitate the escape of the morbid secretions from the alimentary canal. This may be done partly by the copious use of diluent drinks, and

partly by an occasional dose of castor-oil. If we carefully observe the condition of a patient in collapse, we shall often find that the intestines are more or less distended with liquid, and this, too, while perhaps there is general torpor and little or no effort at expulsion. Again, it has often been found that, although there has been copious watery purging during life, the small intestines contain after death a large amount of a peculiarly viscid dirty white material, having a very offensive odour. An occasional dose of castor-oil—a tablespoonful every three or four hours during the stage of collapse—may be useful in removing both these conditions; namely, over-distension of the bowel by liquid, and accumulation and retention of offensive viscid semi-solid secretions.

The object and the effect of this treatment is not to increase the amount of liquid which is poured from the blood into the stomach and bowels, but simply to assist and to quicken the expulsion of the morbid secretions from the alimentary canal.

It may be confidently maintained that, inasmuch as the peculiar choleraic discharges are the result of specific blood-changes, induced by a morbid poison, no ordinary purgative can *increase* those discharges, although it may facilitate and quicken their expulsion.

When there is hæmorrhage from the bowel, twenty drops of oil of turpentine may be given in mucilage every two hours, and iced water may be taken freely. *In such a case, no castor-oil should be given.*

After reaction has occurred, an occasional laxative dose is required—about once in the twenty-four hours during the first two or three days.

It is worse than useless to attempt to *feed* a patient during collapse. The secretions of the stomach are utterly deranged; and the power of digestion is suspended. The mildest nourishment administered at this time only adds to the feeling of oppression and general distress, from which the act of vomiting often gives immediate relief.

After reaction has occurred, and when the normal secretions are restored, the mildest nourishment should be given frequently, but in small quantities —such as milk, gruel, or rice, or arrow-root with a small quantity of brandy, soup or beef-tea or chicken-broth. After an attack of cholera the stomach is sometimes long in recovering its tone and the power to digest solid food. When this is the case, a grain of quinine, with ten or fifteen drops of dilute hydrochloric or sulphuric acid and an equal quantity of chloric ether, may be taken with each meal.

Venesection has often afforded great relief during the stage of collapse.* The symptom which appears especially to call for this remedy is rapid breathing, with a feeling of impending suffocation. When, with these symptoms, there is a cessation of vomiting and purging, which is probably a result of the almost entire arrest of the circulation through the lungs, I believe that venesection affords the only

* See p. 13.

hope of saving life. It is difficult to obtain a stream of blood in these cases; not, as many suppose, because the blood is too thick to flow, but because, in consequence of the block in the lungs, the blood in the veins is nearly stagnant. The bleeding appears to be beneficial, partly by relaxing spasm and partly by lessening the distension of the right cavities of the heart, and so increasing their contractile power. Repeated doses of ammonia may help to quicken the circulation.

Consecutive Fever. Reaction from collapse is sometimes followed by a febrile condition—a hot skin, quick pulse, coated tongue, hurried breathing, often a scanty secretion or even a complete suppression of urine, with drowsiness tending to pass into coma. These unfavourable symptoms are more common when, during the earlier stages of the disease, opium and alcoholic stimulants have been freely given; but they may occur when no such means have been employed.

The best treatment consists in a scanty diet without alcohol, copious diluent drinks, with saline effervescing draughts, an occasional aperient, castor-oil, or sulphate of magnesia or a Seidlitz powder, counterirritation over the lungs and kidneys, and sometimes local bleeding to relieve congestion of those organs.

In some cases, there is complaint of pain in the region of the stomach during convalescence. This may be relieved by the application of a few leeches over the seat of pain, or sometimes by a mustard

poultice. If, after reaction, the stomach remain irritable, with frequent vomiting, iced water is an agreeable and efficacious remedy.

Preventive Measures. The choleraic discharges from the bowels should be looked on as highly poisonous, and they should be disinfected and got rid of as soon as possible. Every vessel and article of clothing or bedding soiled by the discharges should be carefully cleansed and disinfected. The attendants on the sick should be warned of the necessity for extreme personal cleanliness. The hands should be frequently cleansed with the aid of disinfectants, and always immediately before taking food.

If these simple measures be adopted, nurses and other attendants on the sick run little risk from infection.

The chief disinfectants are—chloride of lime, Burnett's liquid, Condy's fluid, and Calvert's solution of carbolic acid. These disinfectants are sold with full printed directions for the use of each. Condy's fluid is well adapted for cleansing the mouth and hands before taking food; and carbolic acid for cleansing bedding and clothing, which would be damaged by mineral disinfectants. Any one of the above may be used for disinfecting the stools.

Great moderation both in food and in drink is essential for safety during an epidemic of cholera. A single act of indiscretion has been followed by a severe attack. Intemperance at such a time is fraught with extreme danger.

Unwholesome articles of food, more especially tainted meat and fish and decayed vegetables, are to be carefully avoided. Ripe fruit and fresh vegetables may be taken in moderation with safety and advantage.

Especial attention should be paid to ensure the cleanliness and thorough ventilation of dwelling-houses. All vegetable and animal refuse should be removed as speedily as possible. Care should be taken to prevent the escape of sewer gases into the interior of dwellings.

The purity of the water employed for drinking and cooking should be most carefully provided for. A few drops of Condy's fluid may be used as a test for the purity of water. Organic impurities in the course of an hour or two decolorise the fluid; which is not only a test, but also a purifying agent by oxidising the organic impurities. It is certain that a diarrhœa is often perpetuated by the daily drinking of impure water.

No unnecessary medicines of any kind should be taken. When opening medicine is required, the mildest should be selected, such as castor-oil or rhubarb. Saline purgatives, such as Glauber's salts and Epsom salts, are objectionable, on account of their tendency to cause profuse watery purging. The common belief that prolonged costiveness should not be interfered with during the prevalence of cholera is an error. An accumulation of offensive materials within the bowels may be itself a source of irritation and of danger.

Many persons, during an epidemic season, have an unpleasant feeling of commotion with a rumbling noise in the bowels, and a sense of sinking. This discomfort is often removed by a tonic, such as a teaspoonful of tincture of quinine in water, twice or thrice a day before food. Sometimes ten drops of dilute sulphuric or hydrochloric acid may be usefully combined with each dose of the quinine. Another useful tonic in these cases, more especially when there is a tendency to looseness of the bowels, is a combination of twenty drops of the muriated tincture of iron with a teaspoonful of tincture or syrup of ginger in an ounce of water; and this dose may be taken *after* each meal. The slight bowel derangement just mentioned, will certainly be made worse by laxative medicine; and I repeat that, *during an epidemic of cholera, no unnecessary medicine of any kind should be taken, and, as a rule, none without medical advice.*

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