



DR. BRAITHWAITE
ON CHOLERA.

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ON
CHOLERA:

ITS PATHOLOGY AND TREATMENT.

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SYNOPSIS,

PATHOLOGY AND TREATMENT.—The poison of cholera acts through the blood chiefly on the ganglionic nervous system, at first probably rousing it up to violent action, but followed very rapidly by its paralysis. Thus, at first, we have spasm of the organic muscles of circulation, respiration, voice, of the intestinal canal, and many of the voluntary muscles. The consequence is, that the blood is sent into all the great central veins, and cannot get round to the left side of the heart, on account of the same spasm or contraction of the branches of the pulmonary artery. In short, the circulation is stopped or nearly so. Then follows the real collapse, when spasm relaxes, but it is the relaxation of death unless the vital power has energy enough to begin again. On the first attack of real Asiatic cholera, therefore, do not stimulate—do not interfere with either vomiting or purging*—but use the utmost diligence in giving *chloroform*, both by inhalation and internally. Teach the nurse how to do it, as you cannot be everywhere, and cannot be both doctor and nurse. Relax the cramps and spasm by chloroform; and, if necessary, carefully stimulate by ammonia or champagne, but *not until the spasm is overcome*. The circulation will then be resumed and not be followed by the dangerous reaction, which formerly killed so many patients. But avoid all stimulants if you can, and let the reaction come slowly, and if you feel compelled to stimulate let it be by spt. am. co., champagne, or other mild wine. Give copious draughts of cold water, and

* The premonitory purging of cholera may be cautiously treated in the way we treat English cholera, but if it prove to be the real Asiatic cholera we think that all astringent ought to be at once given up.

even encourage vomiting. Give copious saline effervescing draughts, if agreeable.

Do not give opium at all, let the purging alone. It is supposed that it does more good than harm by *eliminating* the poison, and some even increase the purging by giving castor oil. Encourage vomiting by large quantities of cold water, with a little mustard in it if necessary. The muscles of vomiting are so energetic that the water will often be ejected with violence, but keep repeating the cold water, which is always greedily swallowed. There seems to be no specific power in calomel or any other medicine. Apply external cold or warmth as may be most agreeable. The best way to apply warmth is to wrap the patient up in a blanket wrung out of hot water, and over this hot-wet blanket place three or four other blankets. The hot blanket can at any time be renewed, and if you like you can, during its renewal, wipe the body over with a towel or sponge wrung out of *cold* water. The skin will be powerfully stimulated by this treatment to draw the blood back from the central veins, as soon as the contraction of the pulmonary capillaries will allow the blood to get round to the left side of the heart. Another method is to place the patient in a hot hip-bath with his feet in a foot-bath, the hot water to have about a pound of flour of mustard in it, and to be kept hot by adding hot water as required till reaction sets in, and the cramps and spasm relax. We have said nothing about bleeding, because, although we think that the practice was correct as laid down by the several writers mentioned, yet we have in chloroform and other anti-spasmodics all the good effects of bleeding without the danger. And as to stimulants they are generally injurious: a combination of compound spirit of ammonia with chloric ether, is one of the safest and best stimulants we possess, and champagne and other sparkling wines are now so cheap and good that we should recommend them before all others.

ON CHOLERA: ITS PATHOLOGY AND TREATMENT.

As this formidable disease is once more amongst us, we will again, as we did in 1848, collect some of the most important information respecting it: especially with regard to its Pathology and Treatment. The history of cholera may be very interesting and its cause mysterious, but it is our chief duty in this volume to give such information as may be especially available and useful at the bedside. We have learned much both as to its nature and treatment from our own observations in all the attacks of this disease since about 1832, and from the experience of others: we have learned how to avoid opium, stimulants, and other kinds of treatment which used to be the fashion; we have learned that from some mysterious poison acting at first apparently on the organic nerves, and then on many of the cerebro-spinal nerves, the arterial system becomes violently and spasmodically contracted—the capillaries at one end, and the pulmonary artery and its branches at the other end—so as to collect nearly all the blood in the great central veins, causing the most rapid collapse, and almost completely impeding the circulation through the lungs. We shall make extracts from the papers of Dr. Bell, Dr. G. Johnson, and others, so that our opinions may be coincided with or not. It appears most probable that the subtle poison acts, either through the blood primarily or through the nervous system, especially on the organic nerves, the sympathetic, which supply the contractile power to the arteries, the intestinal canal, the organs of respiration, including the muscles of voice—producing a kind of tetanic contraction, thus emptying all the capillaries into the great central veins. In fact it seems to us to be a kind of *tetanus*. We all know what a small portion of strychnine will act on the body, and why should not a similar effect be caused by the poison of cholera; but on rather different parts of the nervous and muscular systems from those acted upon by strychnine? If we take this view of the disease, we see at once the reason why some of the most successful modes of treatment went on the principle of relaxing spasm, such as bleeding, emetics, the injection of warm water and salines, and especially chloroform; we also see the bad effects of opium and stimulants given alone. The combination of such measures as relaxed spasm, with

careful stimulation was often indeed successful, but not stimulants alone. The virulence of the poison is indeed so great in some cases, or the patient is so feeble to begin with, that the first attack of spasm may be so short as not to be perceived, and may have entirely passed off before the physician has seen him, leaving the patient in that stage of collapse which seems almost hopeless. We would therefore particularly point out to our readers that the successful treatment by chloroform and other antispasmodic remedies is only applicable in the first spasmodic stage, or when this spasm of the organic and voluntary muscles continues to come on. At the time Dr. Bell treated these cases by bleeding, chloroform was not in use. Bleeding, then, was the most rapid and powerful means of relaxing spasm of all muscles, —chloroform has now almost entirely superseded it. The paper which seems to us to have thrown most light on this disease, was published by Dr. C. W. Bell, Physician to the Manchester Infirmary, and late Physician to H.M. Embassy in Persia. When the reader has read this paper and the succeeding one by Dr. George Johnson, he will be struck with the similarity of views. Although Dr. Bell thinks that the spasm is chiefly in the capillaries, thus emptying all their blood into the great central veins, and Dr. Johnson thinks the contraction is in the branches of the pulmonary artery, yet both seem to think that the fault is in the muscular contraction of more or less of the arterial system. For our own part we think the spasm attacks all the organic muscles, and most of the voluntary, and seems to be tetanic. Dr. Bell's paper will be found more at large in *Retrospect*, vol. xvii., extracts from which we shall give as we proceed.

The views of Dr. GEORGE JOHNSON, of King's College, coincide in many points with those of Dr. Bell, although we suspect that he never read Dr. Bell's paper, for in another lecture he says that Bell, Orton, Scot, &c., "none of these writers have any very definite pathological theory. They looked upon cholera as a disease chiefly of the nervous system." We were surprised to read this opinion of Dr. Johnson, and we think that he will alter it should he read this paper. Dr. Johnson says:—

"What is the pathological explanation of this remarkable train of symptoms? The one great central fact is this, that, *during the stage of collapse, the passage of blood through the lungs from the right to the left side of the heart is, in a greater or less degree impeded.* Let us now consider the evidence of there being this impediment to the pulmonary circulation; and let us endeavour to ascertain the probable cause and consequences of this obstruction to the flow of blood. Very conclusive evidence as to the existence of impeded pulmonary

circulation during life is afforded by the appearances observed in the heart, blood-vessels, and lungs after death. The *post mortem* appearances within the chest have been described, with more or less minuteness, by several authors; but by no one, I believe, with so much care and accuracy as by Dr. Parkes. (*Researches on the Pathology and Treatment of the Asiatic or Aljide Cholera.*)

“In the great majority of cases in which death has occurred during the stage of collapse, the right side of the heart and the pulmonary arteries are filled, and sometimes distended, with blood; while the left cavities of the heart are generally empty, or contain only a small quantity of blood; the auricle being partially and the ventricle completely and firmly contracted. The tissue of the lungs is, in most cases, of pale colour, dense in texture, and contains less than the usual amount of blood and air. With respect to the extremely anæmic condition of the lung, when death has occurred during the stage of collapse, there is an entire agreement amongst those authors who have most accurately described the *post mortem* appearances. There is something surprising, as Briquet and Mignot observe (*Traité Critique et Analytique du Cholera Morbus*), in the contrast between the almost constant occurrence of this extremely anæmic condition of the lung, from which scarcely even a few drops of blood flow when the tissue is cut, and the hyperæmia of most of the other viscera.

“There is a remarkable contrast, too, between this anæmia of the lung when death has occurred during collapse, and the great engorgement of the lungs which is almost invariably found when death occurs in the febrile stage which often follows reaction.

“Now, it is evident, from the appearances here described that, during the stage of collapse, there is an arrest of blood in the branches of the pulmonary artery *before* it has reached the pulmonary capillaries. The arrest at this point explains the remarkable anæmia of the texture of the lungs, while the hyperæmia of the lungs after reaction is due to engorgement of the pulmonary capillaries. Before I attempt to explain this remarkable arrest of blood, it may be well to allude briefly to certain phenomena in the living but collapsed patient which afford confirmatory evidence that the pulmonary circulation is greatly impeded. The impeded flow of blood through the lungs resulting, as it must, in a very scanty supply of blood to the arteries, accounts for the character of the pulse in cholera. It accounts, too, for the fact that the pulse has often been observed to increase in power and volume under the influence of venesection, which, by relieving the over-distension of the right cavities of the heart, increases

their contractile power. (See Dr. Reid's essay *On the Effects of Venesection in Reviving and Increasing the Heart's Action under Certain Circumstances.*)"*

"I believe the true explanation of the arrest of blood in the lungs to be this. The blood contains a poison whose irritant action upon the muscular tissue is shown by the painful cramps which it occasions; the blood thus poisoned excites contraction of the muscular walls of the minute pulmonary arteries, the effect of which is to diminish, and in fatal cases entirely to arrest, the flow of blood through the lungs.

"We have seen that the condition of the lungs after death during collapse affords conclusive evidence that the arrest of the blood occurs, not in the capillaries, but in the branches of the pulmonary artery, before the capillaries are reached by the blood. We know that the walls of the arteries are muscular, and that they have the power of contracting upon their contents under the influence of a stimulus, such as cold, electricity, or mechanical irritation. I suppose that no physiologist at the present day would deny that spasm of the arteries is as real a fact as spasm of the muscles."†

"The most interesting and conclusive evidence that arrest of blood in the lungs is the true key to the pathology of choleraic collapse, is to be found in the simple yet complete explanation which it affords of all the most striking chemical phenomena of the disease—the imperfect aëration of the blood, the fall of temperature, the dark and thickened appearance of the blood, and the suppression of bile and urine.

"*Chemical Consequences of the Obstructed Flow of Blood through the Pulmonary Arteries.*—It is obvious that the stream of blood from the pulmonary capillaries to the left side of the heart is the channel by which the supply of oxygen is introduced into the system. One necessary consequence, then, of a great diminution in the volume of blood transmitted to the left side of the heart, must be that the supply of oxygen is lessened in a corresponding degree. This position probably will not be disputed by any one who will give the subject a moment's consideration. Nor, again, can it be denied or doubted that certain results must of necessity follow this limited supply of oxygen.

"The combustion of those constituents of the blood which are normally subjected to the action of oxygen will be diminished in proportion to the deficiency of that gas; and thence follow simultaneously and of necessity a reduction of temperature, and so scanty a formation of urinary and biliary constituents, that while the state of collapse continues, the functions of the kidney

* British Med. Journal, Nov. 11, 1865, p. 491.

† Ibid, p. 492.

and liver are virtually suspended. The blood at the same time has that black, thick, treacherous appearance which is not peculiar to the collapse of cholera, but which is common to it with all diseases which are attended with a defective aëration of the blood. The blood has this character during the cold stage of a severe ague fit. Dr. Mackintosh and others, who have bled patients during the cold stage of ague, describe the blood as flowing from the arm at first in a slowly trickling stream, being of a dark colour, and not coagulable. (See Mackintosh's *Practice of Physic*, vol. i. p. 86 *et seq.*) Dr. Dundas Thompson, who published an elaborate paper on the Chemistry of the Blood in Cholera (*Med.-Chir. Trans.*, vol. xxxii, p. 67), states that one specimen of blood from 'a patient who laboured under an affection of the mucous membrane of the air-tubes', contained a greater excess of solids, in proportion to water, than he had found even in cholera-blood.

"The blood in cholera is black and thick only during the stage of collapse; in other words, during the stage of pulmonary obstruction and defective aëration. This state of the blood bears no relation to the loss of water; it comes on when the loss of water has been very trifling; it passes off rapidly, while loss of water by purging continues unchecked. It is simply a result of defective aëration, just as the thick and smoky flame of a lamp is a result of defective aëration.

"The constituents of bile and urine and carbonic acid are all results of oxidation; none of them can be formed without a large supply of oxygen. Suppression of bile and urine during the stage of collapse is a necessary consequence of the limited supply of oxygen which results from the obstruction in the lungs. The amount of carbonic acid expired during collapse is also much diminished. (See, on this point particularly, Twining's *Clinical Illustrations*, &c., 2nd ed., p. 15.) One fact confirmatory of the view that the very scanty formation of bile, urine, and carbonic acid during collapse is a result of the diminished supply of oxygen, is, that *the secretion of milk continues apparently undiminished*. I have myself observed this fact, and it has been mentioned by several authors. Thus Magendie states that, one of his patients having been delivered of a child a few days before she was seized with cholera, the secretion of milk continued so abundant through a first and a second collapse, which ended fatally, that it was necessary to empty the breasts, in order to relieve the pain which their distension occasioned. Now, if the other secretions are suppressed on account of the deficiency of water in the blood, why does the secretion of milk continue? Magendie says, because the blood reaches the breasts, and supplies the materials for their secretion, on account of those glands being nearer to the heart than the liver and

kidneys, which, being at a greater distance, do not receive the supply of blood necessary for the discharge of their functions! My explanation of this remarkable and instructive fact is simply this. The chief constituents of milk—casein, sugar, oil, and water—may be obtained from the blood without the addition of oxygen. The secretion of milk, therefore, continues during the stage of collapse; while the highly oxygenised secretions are suspended, their essential constituents being formed only in very minute quantities during that stage, on account of the defective supply of oxygen.

“*Explanation of the great temporary Relief resulting from the Injection of a Hot Saline Solution into the Veins.*—No theory of collapse can be considered complete which does not give a satisfactory explanation of the great temporary benefit which immediately follows the injection of a hot saline solution into the veins. I have before referred to this subject (see *ante*, p. 251); and I deferred my explanation until I had given some account of the phenomena of collapse.

“I have adduced many facts and arguments in proof of the position that the essential cause of collapse is an arrest of blood in the lungs, occasioned by a spasmodic contraction of the muscular walls of the pulmonary arteries. If this be the actual cause of collapse, we might, *à priori*, expect that for a time it would be removed by the injection of a hot fluid into the veins. The temperature of the fluid injected by Dr. Mackintosh varied from 106° to 120°; but he states that “the good effects of the injection were rapid in proportion to the heat of the solution.” (*Op. cit.*, vol. i, p. 365.) The hot fluid, rapidly mixing with the blood in the right side of the heart and in the pulmonary artery, would as it were dilute the poisoned blood and render it less irritating, just as diluents render the urine less irritating to an inflamed bladder or urethra. It is probable, however, that the chief action of the injection would be to relax the spasm of the minute arteries by its high temperature.* Thus, the impediment to the circulation being overcome, the blood rapidly flows on to the left side of the heart and the arteries, and the phenomena of collapse pass away with marvellous rapidity. The benefit, however, is of but short duration; for the primary cause of the impeded circulation—namely, the

* Dr. Parkes, who tried the injection in some cases, states that he did not see even the temporary vivifying effects which others describe. (*Op. cit.* p. 219.) The probable reason of this is, that the temperature of his injection was too low. In one case, he says it did not exceed 98°; while in another it was “tepid”. In the other cases, the temperature is not stated. I think, therefore, that Dr. Parkes’s failure to do good by a tepid injection is confirmatory of my view, that the high temperature of the injection employed by Dr. Mackintosh and others had more influence than the mere mixture of water with the blood. I believe that the hottest room of the Turkish bath would quickly relax the spasm of the pulmonary arteries; and so, if it did not cause faintness, it might be a real help to recovery.

poisoned condition of the blood—being still in operation, and the originally hot solution being cooled down by its diffusion through the entire mass of the circulating blood, the stream of blood through the lungs will soon again be obstructed ; and the patient thus passes into a state of collapse as profound as and more hopeless than before. It appears, therefore, that the hot saline injection into the veins, and the operation of venesection, when it rapidly relieves, as it often has done, the symptoms of collapse, have this effect in common, that they facilitate the passage of the blood through the lungs, and thus lessen that embarrassment of the pulmonary circulation which is the essential cause of choleraic collapse. But, whereas the hot injections act by removing the impediment which results from spasmodic contraction of the arteries, venesection acts by relieving overdistension of the right cavities of the heart, and thus increasing the contractile power of their walls.

“In concluding this communication, I would implore those pathologists who have hitherto thought that the temporary benefit following injections into the veins affords conclusive evidence that collapse results from loss of water, to consider whether the explanation here offered is not at least as probable, as complete, and as consistent with all the known facts of the problem, as that which is commonly received.”*

These views of the pathology of cholera will be seen to agree very much with those of Dr. Bell, but we think that Dr. Johnson *localises* the arterial spasm too much to the pulmonary arteries. It is well known that Dr. George Johnson strongly advocates purgatives in these cases, to eliminate the poison. We think his success may be encouraging, but his explanation is not, to us, satisfactory. We would by no means discourage either vomiting or purging, but in most cases nature herself does quite enough in this way, without being assisted.

Dr. G. WALLIS, of Clifton, Bristol, believes that cholera is produced by the decomposition of animal and vegetable matter. He does not regard it as contagious. He says:—

“It is true that women who washed the soiled linen of those who have died of this epidemic sometimes were affected by this disease ; but it must be remembered that heat and moisture conveyed the poison to the lungs. All those who are weak, irritable, and highly susceptible are often knocked down at once by the deleterious atmosphere of cholera ; but stronger persons who have not stayed too long in the tainted air recover. This fact accounts for the uniformity of the mortality in the different countries over which it passed, and the different modes of

* British Med. Journal, Nov. 11, 1865, p. 491.

treatment which have been adopted in the various places. So that medical treatment can do nothing in some cases; they either die or get well, according to the strength of the vital power or the force of the poison on weak habits. Medical aid can only be useful in such cases as are on the balance, and are struggling to continue the vital functions. Sanitary measures are, no doubt, useful, because all malarial add to the destructive power of the epidemic.

“The cholera never appeared in this country until the year 1832, although malaria of various kinds were extensively in existence; cesspools, stagnant ditches, and manure heaps were far more commonly distributed over the whole country than they are now or have been since 1832; so that malaria has nothing whatever to do with the production of cholera. Poverty and overcrowded rooms may produce low fever, but they never produce cholera or typhus fever. This is an impossibility, for these diseases are produced by specific agents.

“The phenomena which are exhibited when the deleterious air has been drawn into the lungs are these: The great gastro-pulmonary nerve is either wholly or partially paralysed; the consequences are the cessation of all its functions, either wholly or partially. This great nerve is a nerve of function, and performs the functions of digestion and respiration, and influences all secretions. Air is drawn into the lungs, and is expelled in the same state as it was when taken in, except its having been in contact with a moist animal surface; that air remains cold, and there is no secretion of carbon (the essential principle of respiration), so that this process of the vital actions is, in effect, abolished, and the skin assumes a blue colour. The muscles which draw the air into the lungs remain unaffected, and continue their action. In most cases (when the victim is not at once destroyed) the bowels act once largely, and then all secretion is suspended. It will be seen at once that remedies can be of no use in stopping the progress of this disease; except when the vital powers are struggling to continue their functions, they may be assisted by helping them to overcome the difficulties that obstruct them.

“The most painful effect of this disease is the universal spasm or cramp which pervades the whole body, and this arises from the condition of the stomach. Although fighting symptoms is a very bad mode of contending against a disease, yet relieving pain, and so far lessening the evils of the sufferer, is a legitimate object of humanity. As the air which produces this disease is limited, the sufferer should be at once removed to a purer atmosphere. The most effective remedy in relieving all spasms is the spirit of turpentine, one drachm of which is an ordinary dose, but its quantity must be suited to the object

required. It is not intended to recommend remedies for the relief of cholera; it is merely intended to be a guide to younger men in the consideration of this formidable epidemic. No epidemic can be contagious, as the state of the air breathed is the exciting cause of this disease. Ignorance alone produces fright, and fright magnifies all horrors.”*

We agree with Dr. Wallis that in almost all cases, *at the very commencement*, this spasm or cramp exists more or less, but this may pass off so rapidly, and be followed by such complete collapse, that it may even escape the notice of the physician. His success, however, depends on this knowledge of the nature of the attack.

Dr. W. G. MAXWELL, of Calcutta, corroborates many of the foregoing remarks:—

“The development of the stages of fever entirely depends on the changes the heaven has effected. If this change has been such that the blood has become too thick to flow through the lungs, then, as a matter of course, the collapse stage is developed in excess; in other words, cholera asphyxia is exhibited. The blood, unable to pass through the middle passage into the arteries, collects and swells out the veins, giving that deadly or blue colour to the skin. When the vomiting and spasms come on, this mass of blood in the veins is squeezed with great force, and hence the clammy moisture that is forced from every part during these fits. There is no pulse, because there is no blood in the arteries. There are also lethargy and langour, and oppression in breathing, caused by the blood being all collected in the veins. These make up the principal links of the chain of mechanical symptoms.”†

Dr. Maxwell had a violent attack in his own person and found the greatest relief from effervescing soda powders mixed up in large quantities of water. He took fifteen tumblers full of this effervescing draught with the greatest relief although frequently vomiting them as soon as taken.

Another valuable paper is by Dr. MASSY. He says:—

“The symptoms increase if not checked by medicine; cramps of the most violent description come on, chiefly in the feet, calves of the legs, thighs, and hands, which cause such excruciating torture, that I have rarely met even the most resolute able to resist screeching out. The skin now becomes quite cold, assumes generally the blueish hue so remarkable in cholera, and in a short time you will find it corrugated in almost every part, reminding one exactly of a woman’s hand after washing for

* Lancet, Nov. 11 1865, p. 544.

† Retrospect, Vol. xviii., p. 389.

several hours. You will also be struck by the very peculiar countenance of the patient; the features are all sharpened; the eyes sunk in the orbits, but starting wildly; the tongue, if you place your finger on it, will be found quite cold; the patient's breath, if he breathes on your hand, is also cold. I shall never forget the first time a man in the advanced stage of cholera breathed on my hand—it actually made me start, it was so much colder than the atmosphere; all this time the patient screams out for cold water to drink: if you ask him is he cold, he says no, he is burning hot, he wants something cold to drink. I never actually tested how much a man in this state would drink, but fancy it would be something enormous, for he generally throws it up as fast as he drinks it;—sometimes, one would fancy, by a spasm of the œsophagus, for it has hardly time to reach the stomach, and still while he is vomiting he stretches out his livid hands, crying more, more!

“The treatment of this case depends in the first instance on bleeding, and largely, if the patient's pulse is good, giving at the same time twenty grains of calomel with one of opium. This, I think, will be found the best practice, at least we found it so in the hospital of the 31st Regt. Often have I seen the purging and vomiting cease almost instantaneously. The calomel and opium in the first place act as an immediate sedative, and the bleeding relieves the circulation more than purging, removing a mass of blood instead of depriving it of its fluid part. After twenty minutes give ten grains more of calomel and half a grain of opium; this will further prolong the cessation of the symptoms, and in about an hour you will find the calomel acting freely on the liver, when quantities of bile will be passed by stool. When it has acted in this way for some time you may give opium, but not till then: of the various species of practice I have seen tried, I think a reliance on opium in this form of cholera the most faulty: you may exhibit any amount of opium, while a man is purging and vomiting white fluid, without producing a single sign that the medicine has been swallowed,—the purging and vomiting still continue. If you happen not to see your patient (as is too often the case among soldiers) until the disease is farther advanced,—until his voice is changed, pulse a good deal reduced in strength and frequency, features sunken, temperature reduced, skin blueish, tongue cool, &c.,—I would recommend the bleeding to be smaller. You may be able to repeat it; but, as you draw blood, stimulate, give punch, brandy, or wine and water, or carbonate of ammonia. Apply friction, with stimulating and hot liniments to the extremities, warm sand-bags to the feet, sinapisms to the calves of the legs and pit of stomach; for if once you can raise the pulse, the chances in favour of recovery

will be vastly increased. I have seen more than one case where the pulse improved after this treatment and again fell away, when it was deemed advisable to take blood a second time with decided advantage, stimulating at the same time. Cases of this kind cannot endure the loss of blood, even in small quantities, without stimulants. This we learned by sad experience at Umballa; most of the cases we bled in this stage sunk without a rally. We were about to condemn bleeding in cholera, when once the symptoms of collapse set in, but we tried stimulants together with the bleeding, and found the practice the most successful of all we adopted.*

In this paper Dr. Massy points out the practice of bleeding and stimulating at the same time, that is, relaxing the cramps and spasm of the arteries, and judiciously keeping up the powers of nature while this depressing treatment was carried out. This can be done beautifully by substituting chloroform for bleeding, and even by combining the internal administration of compound spirit of ammonia and good large doses of chloric ether. The chloric ether, being made from chloroform, acting as it were both as a stimulant and sedative, or antispasmodic.

We have placed before our readers some of the most valuable papers on this dreadful disease, and we will now endeavour to *pick out* from them and other papers some of the best modes of

TREATMENT.

We cannot but think that the most serious mistakes have been made in the treatment of cholera, chiefly owing to not knowing what cholera really is. Let us first point out some of what we consider the most sensible explanations of its pathology. Our opinion is, that it consists in a tonic rigidity, spasm, or tetanic contraction of nearly all the arteries of the body, caused by some violent poison acting on the organic nerves, the sympathetic, and all its branches and connections. The small terminal arteries and capillaries being thus spasmodically contracted, the blood is driven inward upon the great veins. Dr. BELL says:—

“When this has reached to such a point as to oppress the action of the heart, yawning first, and then shivering, or a sense of suffocation and pain in the præcordia, are the indications of oppressed circulation, and of the commencing effort of the heart to overcome the mass of blood which is stiling it. If, by the application of tourniquets to the limbs, or by bleeding, part of the blood which is rushing from the extremities to increase this congestion is prevented from reaching the great

* Retrospect Vol. xvii., p. 127.

veins,—the heart, excited to increased action, is enabled by this relief more quickly to overcome the obstruction and restore the balance of the circulation, and the paroxysm passes off. If not thus mechanically aided, the heart, after a severe struggle to maintain the circulation during the period of constriction, is at length relieved, by this nervous disturbance or spasm of the capillary circulation passing off of itself, and then the heart and arteries, so long excited by the struggle, maintain for a time their increased action after the obstruction in the capillaries is removed, and produce apparent febrile action. Presently this excitement subsides, the vessels become relaxed, and sweat succeeds. The vessels continue in this state for a longer or shorter period, according to circumstances, till they at length recover their ordinary tone and action in the intermission. This fever, however, is not fever properly so called, but reaction; and the sweating not critical or essential, but relaxation. The cold stage is alone essential, and is the physiological cause of the subsequent stages.”*

“Collapse, if it mean anything, surely means a sinking from the cessation of the power which supported the vital actions, but the more the condition so called in cholera is examined, the more, I am convinced, it will be found that it arises from an active cause controlling these powers; that, if collapse from sinking or hemorrhage may be termed adynamic, we shall be forced to express that which occurs in cholera by the contradictory term dynamic; that it is an active, not a passive, condition of the capillary circulation. It is obvious that, if this distinction be not made by the practitioner, he will inevitably attempt to treat collapse in cholera on the same principles that he would adopt in an apparently similar condition of the system proceeding from a deficiency of action. It is true that both in adynamic collapse with sinking and syncope, and in that of cholera, which I have termed dynamic, there is diminished circulation and arterial action; but in the first the pulse is open, soft, and feeble, and unless proceeding from hemorrhage, becoming generally slower, softer, and feebler, till it ceases; whereas in cholera it is contracted, small, and wiry, as long as it can be felt.”†

“At the same time that the blood over-distends the cava and oppresses the heart, being still poured inwards from the extremities to which their well-valved veins permit no regurgitation, it is necessarily driven back from the gorged vessels upon all the internal venous branches unprovided with valves; the renal veins are distended, and the returning current of blood from the kidneys stopped; consequently a first effect or symptom of

* Dr. Bell, *Retrospect*, Vol. xvii, p. 109.

† *Ibid*, p. 111.

such congestion is the cessation of the secretion of urine, and the first urine passed on recovery from cholera is often mixed with serum and blood-globules. In like manner the hepatic circulation is oppressed, impeding the secretion of bile; these two constitute the second class of mechanical effects or symptoms. At the same time another effect is produced by the same cause: the portal circulation, at first impeded by meeting the reflux from the vena cava, is presently reversed, and the blood is thrust back into the mesenteric veins, till it distends their extreme ramifications on the mucous membrane, where it finds a species of vent; for from this surface the repellent force squeezes out the fluid portion of the blood into the bowels, carrying with it the mucous epithelium, and constituting that serous or rice-water evacuation which is esteemed characteristic of cholera, but which has no title whatever to the name of secretion, or to be treated as such, being a mere exudation which is the very reverse of a vital action.”*

There is one important omission in the explanation of Dr. Bell which is well filled up by Dr. Johnson, of King's College. According to this view of Dr. Bell the blood is forcibly sent into the great central veins, and Dr. G. Johnson beautifully explains *why it is kept there and cannot get any further*. If the road had been clear and uninterrupted through the lungs, the blood would easily have got round to the left ventricle, and have again gone its round, but it is stopped by the spasmodic contraction of the minute branches of the pulmonary artery which will not even allow the blood to enter the pulmonary capillaries, as shown by the remarkable anæmia of the texture of the lungs.

“The one great central fact is this, that, *during the stage of collapse, the passage of blood through the lungs from the right to the left side of the heart is, in a greater or less degree, impeded.*”†

“The tissue of the lungs is, in most cases, of pale colour, dense in texture, and contains less than the usual amount of blood and air. With respect to the extremely anæmic condition of the lung, when death has occurred during the stage of collapse, there is an entire agreement amongst those authors who have most accurately described the *post mortem* appearances. There is something surprising as Briquet and Mignot observe (*Traité Critique et Analytique du Cholera Morbus*) in the contrast between the almost constant occurrence of this extremely anæmic condition of the lung, from which scarcely even a few drops of blood flow when the tissue is cut, and the hyperæmia of most of the other viscera.”‡

* Dr. Bell, Retrospect, Vol. xvii, p. 113.

† Dr. Johnson, British Med. Journal, Nov. 11, 1865, p. 491.

‡ Ibid, p. 491.

This anæmic state of the lungs, however, only continues during the stage of collapse. When reaction follows, the lungs become gorged with blood, while we suspect the other viscera are more or less relieved by the circulation going on once more. Thus the blood is driven inwards from the general capillary circulation, and prevented from getting further on account of the similar contraction of the pulmonary arteries. On the clear understanding of this one point we think depends the whole success of the treatment of the first stage of cholera; and with this view before us we can see the great success which has attended certain modes of treatment. Dr. Bell explains his success by bleeding, by supposing that he thus diminishes the quantity of blood in the great central veins, but this is not a correct or scientific explanation. The bloodletting relieves the spasm of the capillaries, emetics act in the same way, and even the encouraging of the vomiting by water relaxes muscular spasm in the same way as ipecacuanha, antimony, belladonna, and aconite, and in a similar manner we think that the injection of warm water or salines act. But it is to *chloroform* that we especially wish to direct the attention of our readers, and to the cases which have been cured by this wonderful agent. We ought always to remember that the period of spasm is not uninterrupted, it comes and goes like tetanus; although perhaps always, more or less, existing till nature fairly gives way, and then we have complete prostration and relaxation of all the muscular system, but (if the patient live long enough) with a consequent reaction in the circulation, and congestion of those parts which were previously anæmic. Hence, if we bleed or nauseate, or use chloroform, these ought to be done *only during the period of spasm*. If the spasm be carefully and early overcome, without producing violent reaction by stimulants and other means, the cure of the cases is accomplished. Let us examine some of the most important measures resorted to in this early stage of this disease, for in this consists the great success.

Bleeding.—With respect to this mode of treatment the reader ought to notice particularly the following directions of Dr. BELL:—

“When the exudation from the bowels or skin is yet flowing freely,—for in different forms of the epidemic either symptom may predominate,—and when the heart is heard to be struggling in an extraordinary state of excitement, and in the active endeavour to overcome obstruction, it is *churning* as if it would burst,—a sound difficult to describe, but once heard, never to be forgotten,—when, I would say, the sound of the heart conveys to the listener the impression that it is labouring with unabated vigour of reaction, the lancet cannot be used too

promptly; but when the attack has continued for four or five hours,—when the purging has become less copious,—and when instead of manifesting a continuous struggle, the heart appears only to be roused up to reaction at intervals, when the natural warmth of the skin is a little more extended on the neck and chest, and the patient though still tossing uneasily, is not now in his previous agony, I would hold my hand and trust to medicine for some hours to come; I would then wait until I observed him rest a little more quietly, and bear the weight of the bed-clothes for a time, and until the heart's action continued comparatively tranquil for half an hour or an hour; then, indeed on the very first symptom of renewed distress, or even sooner, I would bleed without hesitation, till the thick tarry blood, that at the first is squeezed and kneaded from the arm with difficulty, flows freely from the orifice, and becomes changed to a fair florid hue.

“All depends upon the period at which bleeding is resorted to. If early in the congestive stage, or just previous to its second accession, it is invariably successful; if just as the congestive stage is passing off, when the pulse begins to acquire a little power, it is invariably fatal.”*

This fact Dr. Bell explains in the following manner. In the first stage the heart is excited to the utmost by distension of its cavities from behind, and opposition to its action by spasm of the capillaries in front; bleeding gives relief from the pressure *à tergo*, and probably aids in relaxing the spasm, while at the same time by relieving the congested state of the great secreting organs, it enlists their sympathies in support of the vital actions; and the power of the heart being unimpaired, it can now carry on the circulation with vigour. But in the second stage, the heart's energy is much exhausted, and its vital irritability impaired, by long-continued distension; and syncope and relapse will be the probable effects of bleeding. If then we cannot bleed what are we to do? We must use those medicines which will invigorate and regulate the circulation generally, and control the tendency to periodical disturbance.

We think, however, that bleeding will never be a favourite remedy with British practitioners.

Emetics.—Ipecacuanha, tartar emetic, mustard-and-water, &c., are all more or less useful. The state of nausea relaxes spasm, and the act of vomiting seems almost, for the time, to stimulate, as well as to have the effect of nausea. Many of the most successful cases are those in which free vomiting exists encouraged by copious draughts of cold water or mustard-and-

* Dr. Bell, Retrospect, Vol. xvii., p. 114.

water. Nature herself often does this unassisted and for our own part we would never discourage vomiting.

Chloroform.—This we think will prove to be the most important remedy in the *early stage* of cholera. Chloroform has been found to be wonderfully efficacious in relaxing all kinds of spasmodic action. In epilepsy, tetanus, hysteria, puerperal convulsions, &c., we have found it to be invaluable. *Chloroform therefore will be a valuable remedy in the earliest stages of cholera*, and will, we think, supersede bleeding, emetics, and all other remedies. Its relaxing effects can be watched with the greatest nicety, and accompanied or followed, if *reaction does not come on*, by the very gentle and judicious use of stimulants. We find one of the earliest records of the use of chloroform in cholera in the 'Lancet' for Nov. 4, 1848, by Dr. J. Hill, of the Peekham Lunatic Asylum, who used it at the suggestion of Mr. F. Ferguson, the assistant-surgeon.

Dr. HILL says :—

“The following is our usual mode of treatment :—Place the patient in bed in warm blankets ; give a glass of brandy in hot water, with sugar, and spice ; apply friction to the body by means of warm flannels ; and an embrocation composed of liniment. saponis comp., liniment. camphoræ comp., tinct. opii, and ext. belladonnæ ; apply to the whole surface of the body bags filled with heated bran ; place the patient under the influence of chloroform by inhalation, and keep him gently under its effect as long as the bad symptoms recur, (which they frequently do on its effect ceasing and his regaining consciousness.) Give in the intervals small quantities of brandy-and-water, and thin arrow-root or milk for nourishment, along with milk-and-water, or soda-water with a little brandy for drink. Avoid every thing else in the shape of medicine, and trust to the efforts of nature in rallying from the poison of the disease.

“Of course great caution is necessary in administering the chloroform, and in not pushing it too far. In some instances the patient will sleep for twenty minutes or half an hour—in others, for several hours ; and on waking will again be seized with a return of the vomiting and cramps, when the chloroform must again be resorted to, and the patient kept in a great measure under its influence till these symptoms abate. One of our cases required its use at intervals for twenty-four hours. Again, the reaction after its use may be so great as to require gentle blood-letting ; which occurred in two of our cases, both being persons of full habit of body and sanguine temperament, the one a nurse, and the other a male farm servant.

“Should the simple apparatus commonly used in the hospitals for administering it be not at hand, a small teaspoonful may be poured upon a towel, and will answer very well.”*

It would seem that chloroform acts well as a sedative given internally.

Mr. P. BRADY, of Harrow, gives the following case:—

“Mary Parratt, aged 60, ordinarily enjoying good health, was on Saturday, the 29th ult., attacked with slight diarrhoea, for which the usual homely remedies were used. On the following morning at six o'clock a.m. the diarrhoea became profuse; excessive vomiting supervened, accompanied by spasms in the calves of the legs, fingers, and toes. Notwithstanding the urgent nature of the symptoms, reliance was still placed on the favourite remedy, brandy, without avail, however; the dejections became incessant, the spasms increased in intensity, and at nine o'clock a.m. on Sunday, the 30th ult., I was called in to see the patient, who, it was affirmed, was in a “dying state.” Believing from the description given, that I should have to treat genuine malignant cholera, and having predetermined, should such a case present, to try the effect of chloroform administered internally, I took with me the following mixture:

R. Chloroform, ℥j.; ol. terebinth., ℥j.; aq. dest., ℥iij. M.

“On my arrival I found the patient presenting all the symptoms of malignant Asiatic cholera in an advanced stage; the features collapsed and ghastly; extremities and tongue cold; burning sensation in the stomach and œsophagus; pulse rapid and scarcely perceptible; voice diminished to a whisper; stomach exceedingly irritable, and the dejections from the bowels presenting the characteristic rice-water appearance; and all the voluntary muscles of the body were affected by spasm, so that the patient actually writhed in agony. I immediately administered a large teaspoonful of the chloroform mixture (containing about six minims of chloroform and forty of turpentine) in a wine-glass of dilute brandy, and applied sinapisms to the calves of the legs and abdominal and thoracic surface. Thirst was relieved by drinking plentifully of water, nearly cold. Notwithstanding the irritable state of the stomach, I had the satisfaction to find that the chloroform draught was retained, as well as the fluid drunk after it, and was followed by no dejection. I now (half an hour after the draught) gave two of the following pills:—

R. Calomelanos, ℥ss.; fellis bov. inspis., ℥j. M. et divide in pilulas quatuor.

“In an hour after the administration of the chloroform, vomiting ensued of a portion of the fluid drunk, slightly tinged with the gall; this soon subsided, the diarrhoea had apparently ceased, and the cramp diminished in frequency and severity. I now administered a second dose of the chloroform mixture, and soon after repeated the pills. The stomach retained both; she soon felt decided relief; the pulse rose in power and became slower, the spasms less frequent, and in an hour after the second dose she was bathed from head to foot in a warm perspiration, and expressed herself comparatively free from all uneasy sensations. The attack had been completely subdued, leaving behind a good deal of pyrexia and debility, from which she is now rapidly recovering.”*

MR. G. PLIMMER relates another case of cholera in which chloroform was given as a medicine. He says:—

“I determined on giving chloroform, after giving hydr. chlorid. with opium, which was immediately rejected. I gave the following mixture:—Chloroform, ℥vj.; brandy, ℥iij.; water, ℥ijss. I gave a third part, which was thrown up in half an hour; I gave him a second dose, which was retained; the vomiting and diarrhoea ceased; the spasm less severe. I gave him, in two hours, the remaining part, and during the next six hours I administered, in two doses, six minims more of the chloroform with the most decided benefit; and he is now, the 17th inst., convalescent. To the extreme tenderness over the region of the epigastrium I applied flannel soaked in rectified spirits of turpentine. I observed there was no urine secreted, and I am firmly of opinion that the usual remedies would not have met this case. I candidly confess I had no hope of success, from its severity, and, but for Mr. Brady’s case, I believe I should have lost my patient.”†

MR. STEADMAN gives the following case of English cholera treated by the same remedy.

“About three o’clock on the following morning I was hastily aroused by her husband, as the patient had become much worse. All her symptoms had increased to an alarming degree: the spasm was universal and excessively violent, “as if knots were being tied in her bowels;” vomiting incessant; countenance livid and cold; articulation feeble, praying to be released from her sufferings. As all the medicines had been rejected, I thought it fruitless to continue them, but at once decided upon admini-

* Retrospect, Vol. xviii., p. 420.

† Ibid, p 421.

istering chloroform. A mixture composed of the following was prescribed:—

℞. Chloroform. gr. xiv.; aquæ vitæ (cong.), ʒj.; aquæ destill., ad ʒvj. M.

“A fourth part was given immediately, which had a partial but most satisfactory effect: an abatement of all her symptoms was the immediate consequence. In two hours a disposition to a recurrence manifested itself, when a second dose of the mixture was administered, which entirely controlled all spasms, vomiting, and purging. She expressed herself “very comfortable,” and fell into a quiet sleep. At nine o’clock I again saw her, and found her suffering only from some febrile symptoms, accompanied with much exhaustion. She was ordered cold rice and mucilaginous drinks, and had the chalk mixture with nitric ether prescribed. A dose of ox-gall (gr. x.) was given in the course of the day, which produced three bilious evacuations and some disposition to vomiting, which soon passed away. In two days she was declared convalescent. In 1832, when the cholera visited this place, my patient was attacked, but she declares her sufferings then were nothing in comparison with her late disorder. The two remaining doses of the chloroform mixture were ordered to be carefully preserved in case she had any return of her symptoms. A daughter, grown up, who had assiduously attended upon her mother, was on Wednesday evening seized in precisely a like manner, except that the dejections were more abundant and frequent; and the mother, without hesitation or appeal for advice, gave her the two remaining doses of the mixture. The same magic result followed; the first dose was only partial in its effect, but the second completely subdued the disease. When I called on Thursday, the gratifying announcement was made to me of the success of my medicine in a second case.

“Perhaps I am not justified in calling these decided cases of Asiatic cholera, but the disease in its latter stage, in the case of the mother, assumed a much more severe type than our English form usually bears.

“Without offering any remarks upon the *fons et origo* of the malady in its worst form, and with prospective fears for its soon visiting our shores, I am but too happy (in conjunction with Mr. Brady) in being able to report so favourably of a remedy which I believe only requires to be more extensively tested to be appreciated.”*

In the “Reports on Epidemic Cholera, drawn up at the desire of the Cholera Committee of the Royal College of Phy-

* Retrospect, Vol. xviii., p. 422.

sicians, by W. Baly, M.D., and William Gull, M.D.," the treatment by chloroform is copiously referred to, but, with all deference to these eminent physicians, we think that there is not sufficient emphasis placed on its effects as an antispasmodic. By many it was given more as a stimulant than an antispasmodic, moreover it was often given too late, when collapse had too much set in. Although the poison of cholera seems to act primarily on the ganglionic nerves, almost paralysing them, yet at the commencement of the attack the heart and other muscles are in a state of almost tetanic continued spasm; but this continues a very short time, and if not relieved, is followed by the real collapse, in which stage the powers seem to be exhausted and death soon follows. Bleeding, chloroform, emetics, and all other antispasmodic and exhausting remedies ought only to be used when we want to effect relaxation of cramp and other spasmodic action of the arterial system, the intestinal organic muscles, the muscles of respiration, voice, &c. Hence we find in most of the reports of cases, that the *time* to use these remedies is not carefully pointed out. In the Cholera Reports of the College of Physicians, Dr. DAVIES gives one case in which he used chloroform fifteen hours after the seizure, with relief but not success; we think that it was used too late. He further says:—

“In 22 cases, as severe symptoms came on, the chief remedy was chloroform administered internally in doses of from seven to ten minims every hour, half hour, or quarter of an hour, according to the severity of the symptoms, but of these 22, 8 terminated fatally, and 14 recovered.”

Dr. Davies (second report) :—

“Out of 9 cases of cholera, and 13 of the worst cases of diarrhoea, occurring in my own practice, and treated with chloroform, one died. All these were in the better ranks of life. In some of them, the warm salt-water bath was used as an auxiliary, and the diet consisted of nothing but cold milk and water, with some carbonate of soda *ad libitum*. The fatal case was that of a drunkard, who probably did not take the remedy.

“These cases varied in degree of severity, from sickness and diarrhoea, and some account of collapse, to sickness, diarrhoea, severe cramps, and great collapse, with almost clear watery evacuations passing away involuntarily.

“Of 14 cases of cholera treated by my friend, Mr. Towers, Medical Resident of the Infirmary, many of them under my observation, one died. The fatal case was that of a woman, aged 63, in a state of great destitution.”

Dr. Davies (third report) :—

“It will probably be remembered by the committee, that in my second report, I expressed a very favourable opinion of chloroform in this deadly malady. I considered I had strong grounds for so doing, after observing the large proportion of cases which recovered under its administration. From the history of this last visitation in the county prison, however, the fact turns out, that, under some uncertain circumstances, the use of chloroform will not prevent the proportion of deaths being considerable. I have reason to believe that it was, from over anxiety, given in too frequent doses in some cases, and that it thus rather added to the coma, which is one of the characteristics of the malady.

“At the commencement of the outbreak, the doses were repeated every hour, or every two hours, and it is to be noted, that the first 7 cases recovered. As the cases multiplied, the remedy was given every half hour, and in some instances, every quarter of an hour; the result was, that the next 6 cases died. Whether these cases had anything in them inherently more fatal, it is difficult to tell; the symptoms at first were about equal, and the differences did not show themselves until towards the end. There was next a recovery of 7 cases in succession; in these the remedy was administered less frequently, but subsequently 2 deaths occurred under the less frequent administration.

“The chloroform was administered also by inhalation in some of the more severe cases of cramps, with the effect of affording relief in every instance. The inhalation was not carried so far as to produce perfect insensibility.

“Although I am still of opinion that chloroform, properly regulated, is the remedy, of all others hitherto tried, to be depended upon, yet it cannot be considered as a ‘specific’ for cholera. In one of my fatal cases the chloroform mixture had been taken for two or three days, about every four hours, during the stage of diarrhoea, yet the patient sank rapidly into collapse, and died in two days.”

Dr. Davies’ subsequent statement :—

“I found that no reliance could be placed on chloroform alone. It is true the cramps and pain were greatly relieved by it if the inhalation was carried so far as to produce insensibility, but the course of the disease did not seem to be at all impeded.”*

Now we think that Dr. Davies was more successful than he himself thought: and if chloroform be used very early so as to keep off all spasm, and at the same time stimulants be very

* Cholera Reports, p. 192.

carefully given if the pulse do not rally, we think that success will be great.

Hot Mustard Bath.—An interesting case relieved by this remedy is just related by

Dr. BULLAR, who says :—

“The patient was in the collapsed stage of cholera. His naturally red face was of purple blue; his surface livid, cold, and shrunken, with the washerwomen’s hands. He had rice-water vomiting and purging, was doubled up with abdominal pain, and writhed with cramps in his calves, drawing the strands of his gastrocnemii muscles into rigid cords, which the nurse and porter were rubbing to ease his torture. His pulse was barely perceptible. No urine had been passed since his attack.

“No one who had seen the cholera of 1832 and 1849 could mistake the nature of such a case.

“Had a slipper-bath been available, I should have used one; but as he had been placed in a house adjoining the Infirmary, and only used occasionally for infectious cases, where were only hip and foot-baths, I had him seated in a hip-bath half filled with very hot water with three-fourths of a pound of powdered mustard in it, with his feet in a hot-water foot-bath with a quarter of a pound of mustard mixed with it. The water was as hot as the nurse’s hands could bear—almost scalding hot. That the water should not be merely warm, but very hot, and renewed by degrees to keep up the heat, is most important; and the medical attendant should superintend this himself. Gradually his face improved in colour; the cramps ceased; he did not vomit; and after half an hour, as he expressed a great wish to get to bed, and to pass a stool, he was moved to a close stool, dried, a clean shirt put on, and he was placed in bed, well covered with blankets, and with hot tins to his feet and hands. His pulse, though weak was not easily felt; and his hands, though still cold, were warmer.

“The contrast was striking. When placed in the bath, he was writhing with pain and cramps; when placed in bed, he said he was comfortable, had no pain, and wanted to sleep. Whilst in the bath, he drank freely of milk and water with lumps of ice in it; and was urged to swallow in the intervals of drinking small lumps of ice. Shortly after being placed in bed, he suddenly ejected a large basinful of milk and water, and was not sick afterwards. An hour after he had been placed in the bath, reaction had so far advanced that there were good hopes, and four hours afterwards he was out of immediate danger. He was ordered to take iced milk in smaller quantities, to

swallow ice, and to have broth and tea. He had but one stool of rather a yellowish colour the same evening. No reaction-fever followed; and, except weakness, he was on the second day well.

“Having seen, with Dr. Lake, a case of much less severity, in which reaction went on from the time he applied Dr. Chapman’s ice-bag to the spine, I had one prepared; and, on his being placed in bed, it was applied; but, as it made him chilly and prevented sleep, it was not persevered in. This coldness from an ice-bag is a proof that reaction has occurred, and that it is not needed.”*

In this case the hot mustard bath was beneficial not only in restoring the capillary circulation to the skin, but in relaxing the spasm of the organic muscles generally, but as Dr. Bullar truly remarks, neither this nor any other remedy will avail when the dose of the poison has been so virulent and so large that “the disease begins with death.”

Calomel.—The treatment by calomel was at one time much raised, but we think that it did not deserve all the praise given to it. It was certainly a better treatment than that by opium and stimulants, which was then much practised. It left the cases more to nature.

Cold Water.—This is one of the best remedies. The patient will drink enormous quantities, and perhaps vomit it as rapidly as he drinks it. Nevertheless it ought to be taken copiously and without restraint. Effervescing draughts in large quantities are an agreeable form.

CONSECUTIVE FEVER.—It is too true that even if the first stage of cholera be got over, the patient frequently sinks from the consecutive fever, but we think that the more easily the spasm is overcome, the less stimulants, opium, and other violent treatment be adopted, so much the milder will be the reaction, and consequent fever.

We have not space left us in this volume to dwell at large on the treatment of this stage of the disease. A great number of interesting papers on cholera will be found in our previous volumes. See *Retrospect*, Vols. 17 and 18.

* *British Medical Journal*, Oct. 21, 1865, p. 416.

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