

Observations on cholera : comprising a description of the epidemic cholera of India, the mode of treatment, and the means of prevention / by T.J. Pettigrew.

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SURGEON TO
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13 From the Author.
OBSERVATIONS

ON

CHOLERA;

COMPRISING

A DESCRIPTION OF THE EPIDEMIC CHOLERA

Of India,

THE

MODE OF TREATMENT,

AND THE

MEANS OF PREVENTION.

BY T. J. PETTIGREW, F.R.S. F.A.S. F.L.S.

SURGEON TO THE ROYAL WEST LONDON INFIRMARY AND CHARING
CROSS HOSPITAL, THE ASYLUM FOR FEMALE ORPHANS,
&c. &c. &c.

"Indulgent Nature! O dissolve this gloom!
Bind in eternal adamant the winds,
That drown or wither."

ARMSTRONG.

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1831.

ONE SHILLING AND SIXPENCE.

16

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PREFACE.

ALTHOUGH the nature and treatment of Cholera does not fall immediately within the province of that department of the medical profession to which I have particularly devoted my attention, I have, nevertheless, in common, I doubt not, with my surgical brethren, felt it a duty on my part to make myself acquainted with all that is known upon the subject, to be enabled to meet with advantage and effect the dreadful visitation with which we are threatened, whenever any call shall be made for our assistance.

In the course of my reading, I have been struck with the want of a brief and succinct account of the symptoms by which this disease is characterized; and it has occurred to me as an useful undertaking, to throw into as small a space as possible, and adapted to general perusal, a statement of the appearances which usually precede an attack of the disease, the order in which the symptoms succeed to each other, the varieties which occasionally occur, and the modes of treatment which have been found most successful. Into the disputed question of the con-

tagiousness or non-contagiousness of the disease, it is not my intention to enter at large—my object is one of mere practical utility; and if these few observations shall be capable of allaying any portion of the anxiety which now prevails as to the nature and probable course of the disease, or enable any one more distinctly to foresee, and thereby perhaps to prevent the invasion of an attack, I shall be highly gratified, and shall feel fully compensated for the trouble I have had on the occasion.

T. J. PETTIGREW.

SAVILLE ROW,
November 13, 1831.

OBSERVATIONS,

&c.

RISE AND PROGRESS OF THE EPIDEMIC CHOLERA.

THE accounts given by all the writers from the East on the epidemic Cholera, agree in tracing it from Jessore, a crowded, dirty, ill-ventilated town, surrounded by a thick jungle, and in the rains by an immense quantity of stagnant water. It is situated about one hundred miles north-east of Calcutta, and the disease made its appearance there in the month of August, 1817.* From that period to the

* "The disorder, as it lately visited India, was new in this alone, that there it, for the first time, assumed the epidemical form; and, by the universality of its attacks, became a much more general and grievous scourge than it had hitherto been. It had long existed partially in these settlements, and previously to its late appearance, had been faithfully delineated by three medical officers in His Majesty's service, Drs. Girdestone, Curtis, and Johnson. At no time, however, as far as can be learnt from strict inquiry, did it prevail generally over the country, previously to the autumn of 1817."—*Jameson's Report on the Epidemic Cholera Morbus*, p. xvi. 8vo. Calcutta, 1820.

present it can distinctly be traced, taking a variety of directions, neither confined by land or water, nor restricted by any variation of temperature or climate. Wherever it has made its appearance, numerous have been the victims of its desolation; no restrictions, however severe, have been able successfully and completely to resist its progress, and it has at last visited our shores, and threatens to continue the work of destruction.

In the course of one month the disease travelled from Jessore to Calcutta, attacking, not only the native population of that place, but also the European residents. In the ensuing six months, it extended over a space of not less than 450 square miles, having traversed Bengal from Silhet to Cuttack, and towards the interior, from the mouth of the Ganges to its confluence with the Jumna. At Benares, 15,000 persons perished in the course of two months, so great was its malignity; and at Allahabad, forty or fifty died daily. The mortality was equally great in other places; in the district of Gorrahpore alone, 30,000 were carried off in a month. In the army under the command of the late Marquis of Hastings, its ravages were tremendous. In twelve days nearly 9,000 men had fallen victims to this pestilential scourge. The old and young, male and female, native and European, alike fell under its destructive violence. An intelligent writer, in the *Englishman's Magazine* for April last, describing the progress of the Indian cholera, gives a

melancholy picture of its desolating effects: "The camp (says he) wore the aspect of a general hospital. The medical officers, night and day at their posts, were no longer able to administer to the numerous sick who continued to pour in from every quarter. At this time, the scene was strikingly contrasted to what it had been a few days before. The noise and bustle, almost inseparable from the presence of a multitude of human beings, had nearly subsided into stillness. Nothing was to be seen in motion, save a solitary individual, here and there anxiously hurrying from one division of the camp to another, to inquire after the fate of his companions. Nothing was to be heard but the groans of the dying, or the wailing for the dead. The natives, perceiving the only hope of safety in flight, now deserted in crowds. But their speed frequently deceived them. The fields and highways for miles round were covered with the bodies of many who had carried with them the seeds of the distemper." The Marquis of Hastings resolved upon a change of locality, and having moved about fifty miles in a south-easterly direction, and fixed upon a dry and elevated soil, the disease rapidly declined. It is not necessary here to trace its course across the Deccan, or its direction along the coast until its arrival in Bombay. This, together with its future progress, is fully detailed in the memoir I have just quoted from, and which I recommend to the perusal of the reader. Passing over these details, I shall, therefore, merely remark that the disease also spread along the coast of Mala-

bar and Coromandel, and reached Madras on the 8th of October, 1818. From Coromandel it was conveyed by sea to Ceylon. From the arrival of the *Topaze* frigate from Ceylon, where the disease was raging with great violence, it appeared in the Mauritius; and it is observed that whilst the deaths in the hospital of the town amounted to 94 cases out of 133, the mortality on the plantations did not exceed 10 or 15 per cent. The island of Bourbon was attacked in December, 1819, and of 257 persons affected by the disease, 178 died. During the latter months of this year, the cholera took a south-easterly direction. In Bankok alone, 40,000 died. Having visited Malacca and Singapore by the end of April, 1820, the northern coast of Java was affected by it, and in the month of May the interior of the island felt its violence. Cochin-China, Tonquin, and China, were successively under its influence. Its ravages at Canton and Peking, in 1821, were so great, that the funeral expenses were necessarily defrayed by the public treasury. But the destructive effects of the disease were not confined to this direction. From Bombay it took a north-west course to the confines of Europe, and having traversed the Russian empire, now threatens to desolate the neighbouring states. It is unnecessary to pursue it farther, or to detail even the deaths that took place in Arabia, the Persian Gulf, Mesopotamia, Syria, &c. In Persia and Syria, the disease lay dormant during the winter of 1821; but in the ensuing spring it burst forth with great malignity. In the following

year many of the towns along the Asiatic side of the Mediterranean were attacked, and taking an opposite course, it broke out upon the border of the Caspian Sea. In nearly all of those places the disease has been for a time dormant, and then has made its reappearance sometimes with increased, at others with diminished severity. The presence of strong northerly winds, and the arrival of winter, have not been without their beneficial influence. The city of Astracan has been twice visited by this scourge at an interval of seven years; and in the last attack the disease did not so readily yield as in the former. On the 28th of September, 1830, it broke out in Moscow, having thus travelled a distance of 900 miles in less than three months. To shew the magnitude of the evil thus occasioned by the presence of cholera, the writer to whom I have already referred has thus summed up its geographical career: "From Bengal, its aboriginal province, it travelled *southward* to Mauritius, and to the island of Timor, near New Holland; *eastward*, to Kuku-choton, a Chinese town situated east of Pekin; *northward*, to the frontiers of Siberia and to Astracan; *westward*, to the city of Moscow, a portion of the globe, in extent, about equal to seventy degrees of latitude, and one hundred degrees of longitude."

SYMPTOMS OF CHOLERA.

THE Epidemic Cholera of India is, in almost every respect, unlike the disease known in England as cholera. The former appears to me to partake more of the character of that species of low fever, known by the appellation of typhus; the severest form of which was the plague. The first stage of this fever is characterized by extreme prostration of strength, a loss of power in all the vital functions, an almost entire suspension of the circulation of the blood, and a proportionate degree of coldness of the body and extremities. This is precisely the manner in which many patients are described to be affected by the Indian cholera; and from the few hours in which, in some cases, it has proved fatal, it would seem that there had not been sufficient time, or power of the system adequate, to recover from this, the first or cold stage, to give rise to a re-action, which, in case of typhus, has been called the second or hot stage of the attack.

The cholera which we are accustomed to see in this country, principally towards the close of summer and the commencement of autumn, is decidedly of a *bilious* character. The distinguishing characteristics are either an exceeding redundancy, or a

total deficiency of bile ; when the former exists, the disease may be fairly denominated bilious cholera ; the latter case may be regarded as spasmodic cholera ; in which that state of parts occur so as completely to prevent the flow of bile through the biliary ducts into the intestines ; and it is this form of the disease which most strictly resembles the Epidemic Indian Cholera, the object of our present attention.

From this view of the case, it will at once be perceived, that the two states of this disease are very dissimilar : the former is a very tractable disease, rarely assuming a serious character ; the latter an exceedingly intractable one, and frequently terminating fatally in a few hours. Many of the symptoms, however, are common to both, but varying in intensity ; thus vomiting, purging, cramp in the limbs, &c. The treatment of the former case is exceedingly simple ; the indications are to allay the irritation in the bowels, by carrying off the redundant or disordered bile by gentle purgatives and diluting mucilaginous drinks, and to exhibit saline and anodyne medicines, to remove the thirst and other febrile symptoms, and calm and tranquilize the system.

The spasmodic cholera requires a more minute detail of symptoms. From the best writers on this subject, (amongst whom I must particularly notice Mr. Annesley, the Garrison Surgeon of Fort St. George, Madras, whose opportunities for observa-

tion are only equalled by his zeal and ability to avail himself of them for the public good,) we learn that the epidemic cholera, which has so extensively ravaged the East, has differed from the majority of their epidemics, by the rapidity of its course and the resistance offered to all human means for checking its progress. An attack of spasmodic cholera has been generally observed to be preceded by a train of appearances sufficient to characterize the impending disease, and a timely attention to which may probably be the means of rescuing many a patient from the grave. The countenance is described as denoting considerable anxiety, pallid and sorrowful, although the patient himself seems scarcely aware of his state; and if questioned as to how he feels, he will reply, "very well;" but, if pressed respecting it, will admit that he experiences feelings which he cannot distinctly describe, although he neither feels pain nor sickness. There is, however, dejection of spirits, the pulse is oppressed, and the skin is cold and clammy. Bleeding in this stage, Mr. Annesley states, has been found to be attended with the happiest consequences.* To these premonitory symptoms succeed a sense of uneasiness and distress, attended with heat at the pit of the stomach, or about the navel, nausea, and sickness, followed by numerous evacuations from the bowels, varying in their character according to the nature of the

* Sketches of the most prevalent Diseases of India, p. 24. 8vo. London, 1825.

substances which have been lodged in the larger intestines, and according to the condition of the digestive organs at the time of the attack. A sense of great exhaustion follows, which is rendered more complete by repeated dejections of fluid from the bowels, of a nature resembling rice water, with white flocculent matter floating in it. Colicky pains in the belly are now felt, and the urine is either small in quantity or totally suppressed. In a few cases, pain is complained of upon taking a deep inspiration, accompanied by a sense of tightness across the chest. There is also head-ache and giddiness, a considerable degree of thirst, and an insatiable desire for cold water. The tongue is furred, and the skin is bedewed with a cold sweat.

The more advanced stage of the disease is characterized by a continuance of the vomiting and discharges from the bowels, which are ejected with considerable force, though generally without pain. Cramps now supervene: these affect not only the upper and lower limbs, proceeding from the fingers and toes upwards, but extend also to the muscles of the belly and chest. The anxiety and distress of countenance is greatly increased, the lips are livid, the features are sharpened, and the eyes are sunk in the orbits. The air expired by the patient is cold, there is a cold dew upon the skin, and the pulse is either quick, small, and thready to the feel, or scarcely perceptible. The limbs are cold, livid, and shrunk. They have the appearance of being what is termed

sodden, wrinkled, and corrugated to a great degree. The sense of heat at the pit of the stomach is described as burning, and the head is hot. The tongue has generally the appearance of being bloodless, and is cold, and occasionally it is covered with a glairy mucus. As the disease advances, the violence of vomiting and purging decreases, and often ceases altogether. Sometimes the spasms subside, the patient makes no complaint of pain, the physical powers are quite exhausted, the breathing becomes quick and laborious, but the mind is, in general, unimpaired to the last.

The picture I have drawn of the cases of epidemic Indian cholera is to be regarded as of the severest form. In different cases the symptoms have of course been variously modified, according to the type of the disease or the constitution of the individual affected. In some instances neither vomiting nor purging, nor even spasms were present; in others the vomiting would precede the purging; this order would occasionally be reversed; and in others all the symptoms would be so simultaneous as to completely overwhelm the sufferer, and he would fall down as one struck dead by lightning.

The first stage of the disease, that which may justly be called the collapse, varied exceedingly; it proved fatal from one to forty-eight hours. The other stages of the disease were proportionately longer or shorter, according to the severity of the

attack, and the physical power of the individual affected. The irritability of the stomach, febrile symptoms, disordered condition of the bowels, &c., were frequently of long continuance; and so extensive was the mischief done, and so great the debility produced, that in some cases dropsy ensued. One man is said to have had paralysis of the bladder and lower limbs for a considerable time after the cessation of all the common symptoms of the disease. Fevers of the remittent and intermittent type were common consequences of the disorder. On the degrees of mildness and severity with which the disease affected various castes and classes of persons in different periods and seasons, Mr. Jameson makes one general remark, which is worthy of notice: "The spasms and subsequent re-action (he says) were more remarkable among the Europeans—immediate collapse and prostration of strength among the natives."

APPEARANCES ON DISSECTION.

IN reviewing the symptoms that are present in cases of Indian cholera, it must be remarked, that the most constant, indeed in all the cases detailed by Mr. Annesley, was that sense of heat and burning in the epigastric region, or, in common language, about the pit of the stomach. In proportion to the severity of this symptom was the unslakeable nature of the thirst. Mr. Annesley has endeavoured to connect with this symptom the constant appearance of a vermillion blush over the upper part of the small intestines lying immediately beneath the spot referred to. The blush resembles the preparation of a portion of the intestine minutely injected to display the number and delicacy of the blood vessels of the part. Mr. A. conceives this blush to be "peculiar to this disease, and belonging to its pathological character, because it is the only appearance that is not observable in many other diseases."* Again, "This symptom I consider as particularly characteristic of the epidemic cholera; and this morbid appearance, which is related to it, I conceive to be the particular lesion which is uniformly to be met with on dissection of cases of the disease."†

* Sketches of the most Prevalent Diseases of India, p. 37.

† Ibid. p. 38.

The appearances upon the examination of the bodies of those who have died of the disease, are precisely such as might be anticipated from the symptoms, and point out the absolute necessity of paying immediate attention to the premonitory symptoms, or those which may be said to denote the invasion of the disease.

The *stomach* is generally distended, but its inner surface is corrugated, and bloody spots, either blackish or dark red, are found interspersed between the coats of the organ. It generally contains a dark-coloured grumous fluid.

The *smaller intestines* are distinguished by the vermillion blush on their surfaces, the coats much thickened, and having a doughy feel when pressed between the fingers. They are filled with a pul-taceous matter, either of a greyish or of a yellowish cream colour. The *duodenum* and *jejunum* are usually of the vermillion colour, but the *ileum* is of a darker or purple hue, and the vessels are highly injected.

The *larger intestines*, the *colon*, *cæcum*, and *rectum* are very vascular on their inner surfaces, and contractions of various portions are occasionally found.

The *liver* is found to be gorged with black-coloured blood.

The *gall bladder* usually contains a quantity of dark-coloured bile, and the ducts are so contracted as to prevent the bile from flowing into the bowels, unless considerable pressure be made on the gall bladder; but when the stricture has thus been overcome, the bile is found to pass readily into the bowels.

The *spleen* is generally much enlarged, engorged with thick black blood, and so distended as frequently to fall to pieces under examination.

The *kidneys* are sometimes found quite natural and healthy, at others engorged with dark-coloured blood.

The *urinary bladder* is generally empty and collapsed.

In the *chest*, the *lungs*, the *heart*, and *large vessels* all shew marks of the greatest degree of congestion.

The *lungs* are collapsed, and their natural appearance and character completely destroyed; instead of a cellular structure, they more resemble masses of flesh when cut into, and the substance is loaded with dark-coloured blood.

The right auricle and ventricle of the *heart*, and the larger veins, are usually loaded with black blood;

and this is not unfrequently the case also on the left side of the heart.

In the *head* the same evidences of congestion are apparent. The sinuses and vessels are uniformly engorged and turgid, and fluid, either serum or lymph, is found between the membranes, in the ventricles, or at the base of the skull. Upon cutting into the substance of the *brain*, the bloody points, from divided vessels full of dark blood are very conspicuous.

CAUSES, REMOTE AND EXCITING.—NON-CONTAGIOUSNESS OF THE DISEASE.

IN looking to the history of this disease, we shall find that its attacks in the first instance were chiefly confined to the lower classes of people, to those whose constitutions had been broken down by hard labour, imperfect nourishment, inadequate clothing, and whose duties occasioned them to be exposed to all the severities connected with low and foul situations, and the inclemencies of the night, when the air was loaded with moisture and the alterations of temperature sudden, frequent, and considerable. Those whose happier fortune it was to be well fed and clothed, and not exposed to the causes I have mentioned, generally escaped the disease.

Although the disease first appeared at Jessore, it is the opinion of Mr. Jameson that nothing can be more erroneous than to ascribe to it this local origin. From the statements of the Medical Staff, it had begun to prevail epidemically in the distant provinces of Behar and Dacca; and before the expiration of the first week of August, it had established itself in many parts of Bengal.

To assign the remote cause of any pestilence is a

matter of extreme difficulty, nor can I pretend to dissipate the obscurity. The variable temperature, hot days and cold nights, exposure to heavy dews with imperfect clothing, have been supposed adequate exciting causes to generate cholera. The years 1816 and 1817 were particularly distinguished by a distempered state of the air and great irregularity of season in India. Easterly winds have been generally traced as a powerful agent in propagating the disease; and a remarkable tendency of the disease to follow the course of rivers has been observed. Mr. Jameson's remarks upon this disposition must not be omitted:—

“It is to be recollected,” he observes, “that in India, as in all other countries, the inhabitants flock to the neighbourhood of rivers, for the purposes of commerce; and that the greatest number of towns and cities will thus be found near navigable streams, whilst the banks of every rivulet affording the prospect of gaining a livelihood by fishing, will be crowded with villages. It is perfectly plain, that the population being more thickly gathered in such situations, must always suffer more, on occasion of any general mortality, than more thinly inhabited portions of the country. This cause alone would appear sufficient to explain away the apparent anomaly now under consideration. But there is yet another reason, of equal force: the vicinage of rivers, from the action of the sun upon the great body of water contained in their beds during the

day, and from the influence of the water on the circum-ambient air during the night, must always be peculiarly subject to those vicissitudes of temperature which are known so powerfully to influence the state of the epidemic. Hence great evaporation by day, and falling of fogs and heavy dews by night; and hence a constant interchange of hot and cold currents: all strong exciting causes of the disorder. To all which, if we add their low, muddy, sedgy banks, and the miasma usually found in their confines, we shall be at no loss to account for the great sickness of those residing on their banks, without searching for any more hidden causes of the fact.”*

On no one subject, within the whole range of medical inquiry, does such a contrariety of opinion exist as on that of contagion. Those who appear to be the best informed, are absolutely in the greatest doubt on the subject. The term is in such general use, and yet no one is so indefinitely employed. Contagion and infection have been very commonly used as synonyms; but many writers give arbitrary signification to them, and treat them as terms distinct from each other. Infection is generally understood to imply the communication of disease through the medium of the atmosphere; contagion, the communication of disease by actual contact. Epidemic diseases are generally regarded as being contagious: yet this cannot hold true unless an individual under

* Jameson's Report, p. 105.

the influence of such malady be capable of inducing a similar disease in a healthy person in a situation removed from that in which he himself became infected : and this too without regard either to climate, temperature, or other local circumstances. The power of an individual, who is labouring under a contagious malady, of communicating the disease, will be more or less active, according to the pure or impure state of the atmosphere in which he is placed.

The testimony of the ablest writers on the epidemic cholera of the East, and of those whose opportunities of observing the disease have been the greatest, unites with the popular belief, that the disease is not contagious, if by this term is to be understood the communication of the disorder from a diseased person to a healthy one by actual contact. The disease has arisen in districts far removed from each other at nearly one and the same time, although, in general, the progress of the disease has been slow, with few exceptions, rarely averaging more than a few miles a day. The disease had its regular course of increase, maturity, and decay. Had it been propagated by contagion, it must necessarily have augmented in proportion to its continuance, until subjects for its influence were exhausted, or some agent more powerful than itself arose to check its fury. When the Marquis of Hastings marched his army to a more elevated and healthy situation, the disease declined. Had the continuance of it depended upon contagion, surely

the sick and their baggage would have been sufficient to have kept up the disease. The medical officers and the attendants on the sick do not appear to have been more liable than others to the disease, and Mr. Annesley states that when he took charge of the general hospital at Madras, in 1819, there were fifty-nine cases of epidemic cholera treated by him between the 23rd of May, and the 23rd of August. He was at this time without assistants, and obliged to be in the hospital constantly, both night and day, harassed and fatigued of course, and certainly liable to the operation of an infectious principle, had any such emanated from those who were suffering under the disease. He never experienced any disorder, and only one of the hospital servants had the disease—an extraordinary immunity from its attack. “This hospital,” he states, “generally contained from 170 to 200 patients, natives and Europeans; the wards were open, and a free communication existed between them; and yet, although patients were daily brought into them suffering under the epidemic cholera, although those patients were indifferently distributed throughout the hospital, and, consequently, not excluded from the rest of its inmates, no more than five or six persons, exclusive of the two already noticed,* were seized with the disease,

* The two cases here alluded to as the only instances capable of being adduced in favour of the doctrine of contagion in this disease, are thus stated by Mr. A.: “The first instance was a soldier attending his wife in the disorder, who was himself seized by it, and died an hour before her. But it is evident,

while patients in the hospital, during a period of five years; and certainly those cases could not be imputed in any degree to contagion.”*

in this case, that both were exposed to the same efficient causes, the same epidemic influence; the fatigue and anxiety experienced by the husband whilst attending his wife, proving the determining cause of that influence, and facilitating its operation: and it is equally evident, that if the husband's disorder had arisen from a contagious principle proceeding from his wife, that, like other contagions, it would have required a longer time than the very few hours which elapsed, to operate the changes necessary to its developement. The next instance was that of a female who had attended her friend that died of the disease, in whom she was much interested: after washing her, and removing her from the ward, she was herself attacked. The same remark which was made as to the first instance, equally applies to this. Those patients were in a ward with between eighty and ninety persons, many of whom collected around their beds, and yet not one of that number was attacked with cholera.” p. 241.

* Page 244.

TREATMENT OF THE DISEASE.

REVIEWING the symptoms during life and the appearances after death, it will be apparent that the stomach and small intestines form the primary seat of the disease; and that the shock the system has received from an attack on organs so essential to life, produces a state of congestion in all the vessels in the highest degree. This condition is evident from the coldness of the skin, the colliquative sweats, the livid appearance of the extremities, and the almost entire cessation of the circulation. The extreme vessels are incapable of performing their functions, and the heart and larger vessels are loaded with blood, which, from the condition of the lungs, is perfectly unfitted for the support of the body, and the performance of the vital functions. To restore the circulation to a degree of activity, therefore, must be the primary object in treating a case of epidemic cholera. Bleeding at the commencement of the attack has been found to be most beneficial in its effects. There is, however, much difficulty in carrying this into operation; for the blood, drawn under the circumstances just detailed, is so thick and ropy, that it is scarcely to be obtained.* This condition of the blood applies

* "Although I recommend bleeding to be attempted at all times, and in every stage of the disease, I am fully aware that

equally to that which is contained in the arteries, as well as the veins. Leeches have been repeatedly applied without effect.

To restore warmth to the surface of the body is an object of the very first importance; this should be done by the aid of the warm or vapour bath (the latter is to be preferred), assisted by frictions with spirits of turpentine and other stimulating embrocations and sinapisms (mustard poultices) along the spine, at the pit of the stomach, and to the extremities.

Internally, opium, æther, brandy, ammonia, and camphor, in proportions and quantities adapted to the violence of the symptoms and the condition of the patient, should be given. The essential oils of many cases have occurred where it has not been used at all: nor do I answer for its universal success; but I do venture to assert, that, if it can be accomplished in the early stage of the disease, and before the circulation has ceased at the wrist, in nine cases out of ten it will prove successful, especially if the colour of the blood change from black to red, if the pulse get up, and the spasms be relieved." *Annesley*, p. 170.

"It was, almost in every case, found difficult, from the sluggishness of the circulation, to get the blood to flow, even when assisted by frictions, and the hot bath. Frequently, it had a thick, jet black, oily appearance; and even where small veins were opened, would only trickle down in drops, so as scarcely to give a spoonful in half an hour. Sometimes, again, it would spout out freely for a few moments, as the muscles of the arm were violently contracted by spasm; and then entirely cease, as the patient fell into the state of collopse." *Jameson*, p. 199.

peppermint, cajeput, &c., have been strongly recommended, so also has assafoetida and garlic.

The stricture upon the biliary ducts must be kept in view as of the utmost importance, for it has been found, that in all the cases of recovery, as soon as the bile can be brought to flow into the bowels, the viscid tenacious matter with which the small intestines are loaded begins to separate. Calomel, conjoined with opium, appear to be strongly indicated.*

Mr. Annesley made some experiments on the viscid matter found accumulated in the intestines of patients affected with the epidemic cholera, and has drawn from them some conclusions which are very important in a practical point of view. He successively mixed it with alcohol, which minutely divided it into a number of discrete coagula. Ammonia, æther, and camphor, produced no alteration on it. Diluted nitric acid precipitated it in small flocculi; but tartaric acid in solution, and in considerable quantity, completely dissolved it, and rendered it perfectly fluid. Bile from the gall bladder (cystic) also dissolved it, giving an intermediate colour between the two. Calomel mixed with it in small quantity, formed a dark greenish grey; and calomel

* Mr. Annesley has seen little good arise from the use of opium when administered by itself in large quantities. He thinks that the degree of stupor, and the determination to the brain was greater in these cases than in others. He preferred the exhibition of it in general with calomel.

and cystic bile combined rendered it more fluid, and produced a dark green colour. These experiments were often repeated, and the same results obtained. Hence, Mr. A. recommends tartaric acid as the most useful drink, from its dissolving the matter; and calomel as it unites with and separates it, this producing the dark grey dejections which precede recovery.

In the treatment of epidemic cholera no specific can be offered: that mode, which it may be advisable to adopt in the first stage, will most likely be prejudicial in the succeeding one. The plan of treatment must necessarily depend upon the constitution of the patient. In the poor and desolate, half fed, and imperfectly nourished, the prostration of strength is likely to be the greatest, and the disease to terminate in the shortest period: in the rich and well fed, on the contrary, where the powers of life are more vigorous, there is greater probability of the system sustaining the first shock, recovering from the collapse, and passing on to the next stage of the disorder.

The after treatment principally consists in reducing the febrile action, clearing the bowels, and guarding against congestion occurring either in the head, chest, or body. Some of the organs contained in either of these cavities are sure to suffer, and vigilant attention on the part of the medical practitioner is imperiously demanded.

The signs by which recovery may be predicted, are increased fulness and strength of the pulse, warmth of the surface of the body and limbs, diminished spasm, abatement of the thirst and burning heat at the pit of the stomach, less vomiting and purging, and a return of the secretion of the urine. If bile appears in the alvine evacuations, the prognosis may be very favourable, and in this state generally the skin will be found to be returning towards its natural and healthy condition. The livid appearance of the lips and face will give place to a more healthy hue, the tongue will become reddened at the tip, and the breath of the patient will be of greater warmth. With these changes, there will, of course, be less restlessness, and a disposition to sleep.

MEANS OF PREVENTION.

IN considering those means best calculated to protect and preserve individuals against the attacks of this disease, it is essential to bear in mind the class of persons who have been hitherto most subject to its effects. We have seen that they have been the poor and wretched, famished and half-clothed children of misery. Persons of sober regular habits, avoiding exposure to the vapours and cold of the night, have enjoyed a special immunity from the disease. Fatigue, exhaustion from debauchery, or impoverished diet, alternate exposure to the heat of the sun, and the chills of the night, must necessarily render persons particularly susceptible of the disorder.

The regulations adopted by the various Boards of Health, now so generally established, cannot be too highly extolled. The effects of epidemics may be lessened, or perhaps the diseases themselves exterminated by the cultivation of all the social duties, and by meliorating the condition of our fellow-creatures. Free ventilation, cleanliness, good diet, proper clothing, abundant fuel, cannot be too strictly attended to, nor should the state of the mind be disregarded; dejection of spirits should be counter-

acted, and a cheerfulness from the prospect of an improved condition promoted. Unnecessary alarm should be repressed. One of the most remarkable effects of fear and anxiety is to render those so affected more liable to the attacks of particular diseases. Under the influence of these passions the system becomes debilitated, the power of the heart is diminished, the pulse is rendered weak, variable, and intermittent, and the breathing laborious. Cheerfulness of mind, hope, and confidence, on the contrary, have a wonderful power in the prevention of disorders.

The use of warm and vapour baths, and the wearing of flannel, are of the very first importance; an attention to the condition of the skin, and the maintaining an equable temperature, and an agreeable warmth on the surface of the body and limbs are indispensable.

It appears to me that the too free use of wines or spirituous liquors, with the view of supporting the system against the shock of the disorder, may be injurious, as too stimulating, increasing the heat of the system, and deranging the biliary secretions. Perhaps, some infusion of vegetable tonic, such as chamomile, gentian, colombo, or bark, to which may be added some mild aromatic, might be beneficially substituted for more powerful stimulants.

The state of the bowels should be regarded, but

they ought on no account to be weakened or disordered by a too free employment of purgative salts. "Many instances are noticed," says Mr. Scott,* "where cholera has supervened on the use of neutral purgative salts. The effect of these medicines bears indeed a strong resemblance to some of the appearances in cholera. The clear, watery, debilitating stools; the chill, and, in feverish subjects, the ague fits, which they cause, obviously point them out as unsafe, especially during the prevalence of this disease." The condition of the bowels will be best maintained by a proper attention to diet, and the occasional use of a mild laxative. All raw, crude, and indigestible food should be avoided. The mischievous consequences of eating bad rice, grown in Bengal, the year in which the epidemic arose, not only created a predisposition to be attacked, but was, for some time, conceived to be the sole cause of the disease. Care should also be taken to procure pure water. The Sepoys who had, in the course of their march, drank greedily from every muddy puddle, were affected by hundreds in consequence.

Males have been found to be more susceptible of

* Report on the Epidemic Cholera, fol. Madras, 1824, p. xxxviii.

the disease than females, and in children its attack has been of rare occurrence. Persons having had the disease have been rarely liable to a repetition of it; some instances, however, have occurred, but they are of great rarity.

The existence of this disease was found not to be confined to the human species. Mr. Jameson states, that "there is reason to believe, that the lower animals were in some measure affected by the corrupt state of the air at this period. For it was observed, in many places, that an unusual mortality occurred amongst black cattle, sheep, hogs, and other domestic animals. Thus, in the Backergunge district, cattle had the disorder, and were cured by opium and the other remedies found most serviceable in the human species. Cows, when seized, shed their young. So, in Tipperah, great numbers of horned cattle and sheep were seized with vomiting and convulsions, and suddenly expired. In 1815, again, half the cattle of the lower part of Tipperah were carried off by a disease similar to the cholera. In Delhi, dogs died rapidly; and more horses than usual were carried off by the dry gripes. In the Rajpootanah force, and throughout the whole of the Jeypore and Nagpore territories, the season was remarkably fatal to camels; and, in the centre division, domestic animals of all descriptions died in great numbers; but, in the latter instance, the mortality might be ascribed to want of proper air and food.

At Sumbhulpore, an elephant had every symptom of cholera, and was cured by brandy and laudanum. But the affection of brutes was by no means general." *

* Jameson's Report, p. 194.

THE END.

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