John Brooks,

Bernardston, Mass.

CHART
OF THE PROGRESS
OF THE
CHOLERA-MORBUS.
1831

Note. The red lines indicate the progress of the Cholera-Morbus.

Boston. Published by Carter & Hendee

BRITISH ISLANDS.

A

REPORT

ON

SPASMODIC CHOLERA,

PREPARED BY

A COMMITTEE UNDER THE DIRECTION

OF THE

COUNSELLORS OF THE

MASSACHUSETTS MEDICAL SOCIETY.

BOSTON:
PUBLISHED BY CARTER AND HENDEE.
1832.

ENTERED according to Act of Congress, in the year 1832,
By CARTER AND HENDEE,
in the Clerk's office of the District Court of Massachusetts.

PRESS OF I. R. BUTTS.....BOSTON.

ADVERTISEMENT.

The writings of those medical men, who have witnessed the ravages of the wide-spread epidemic spasmodic cholera in Asia and Europe, must be regarded as the original and authentic sources of information on this subject. Of these the principal are

The Report drawn up by order of the government, under the superintendance of the Medical Board in the presidency of Bengal, by Mr Jameson.

A similar Report for the presidency of Madras, drawn up by Mr Scott.

A similar Report for the presidency of Bombay.

The Russian Official Reports, collected by Mr Leichenstadt.

The British Official Reports, by Drs Russell and Barry.

The works on Cholera by Messrs Annesley, Orton, Kennedy and Bell, relating principally to this disease in India.

Quelques Reflexions sur le Cholera Morbus, par le Dr Jaehnichen, Membre du Consul temporaire de Medicine, de Moscow. Moscow, 1831.

Pensée sur le Cholera Morbus, par F. C. M. Marcus. Moscow, 1831.

Relation Historique et Medicale de Cholera Morbus de Pologne, &c, par A. Briere de Boismont, &c. A Paris, 1831.

And various papers in the London Medico-Chirurgical Transactions, in the medical periodical works, and in similar publications.

Among these, the Committee who have drawn up the following Report, have not been able hitherto to procure the Reports of the Bombay and Madras presidencies, the work by Mr Orton, nor that by Mr Leichtenstadt, all of which are spoken of by European writers with great respect. The Committee would have been unwilling to have finished their Report without these aids, if they had not believed that the full extracts and analyses furnished by the various reviewers, enabled them to judge sufficiently respecting the contents of these valuable works. The Committee have relied especially on those excellent medical periodicals, the Edinburgh Medical and Surgical Journal, and Johnson's Medico- Chirurgical Review. They are also greatly indebted to Mr Kennedy for his abstracts from the Indian reports, particularly those of Bombay ; and to Dr Bisset Hawkins, for the collection of valuable documents contained in his History of Cholera.

The Committee have not neglected to avail themselves of many other works published in Europe, by learned men, who have analyzed and discussed the materials derived from the original sources, and added their own opinions on the various points presented.

The Committee have made very copious extracts from the various original sources above described. This may render the Report less agreeable to some readers. But all who wish to form their own opinions, will be pleased thus to receive the evidence from the mouths of the witnesses themselves.

Boston, May 15, 1832.

REPORT.

At the stated meeting of the Counsellors of the Massachusetts Medical Society in February, 1832, the following preamble and resolves were adopted, viz:

'Whereas, the disease called the Epidemic Spasmodic Cholera has prevailed in various parts of Asia and Europe, and may hereafter appear on this side of the Atlantic ocean, so that it is expedient that the physicians of this country should be prepared to meet this disease; therefore

'*Resolved*, I. That a committee of seven be chosen by the Counsellors of this Society, whose duty it shall be to investigate the history of this disease, and especially to ascertain the best mode of treating it; and carefully and without prejudice to consider whether it be or be not a contagious disease.

'II. That the sum of thirty dollars be appropriated to defray any such expenses for the purchase of books, as may be thought necessary by the committee.

'III. That this committee be authorized to make public the result of their deliberations at the expense of this Society at any period they may think most conducive to the public good.'

The committee appointed in accordance with the foregoing resolves were

James Jackson, M. D. of Boston,
John C. Warren, M. D. of Boston,
George Hayward, M. D. of Boston,
Alfred Perry, M. D. of Stockbridge,
John Green, M. D. of Worcester
Rufus Wyman, M. D. of Charlestown, and
Abel L. Peirson, M. D. of Salem.

The first meeting of this committee was held on the last Tuesday of February, 1832, when a sub-committee was appointed to prepare a Report in accordance with the directions of the counsellors, and to submit the same to the whole committee on the first Tuesday in April.

On the first Tuesday in April, 1832, the second meeting of the committee was held, and this meeting was continued by adjournment to the second Tuesday in the same month. On these days the report, prepared as had been ordered, was considered and discussed by the committee, and after making sundry amendments, the same was adopted. The report was then placed in the hands of the sub-committee to be prepared for the press, and it was ordered that the same should be published under the direction of the sub-committee as soon as this could be done conveniently. This sub-committee was also authorized to make any additions, consisting of facts which should thereafter come to their knowledge, as they should judge expedient.

In laying this report before the public the committee wish it should be understood, that it expresses in a satisfactory manner the opinions entertained by the majority ; but that it must be obvious to all persons conversant with such affairs that several different individuals can never accord precisely in all their views on a subject, in regard to which demonstrative evidence cannot be obtained. It is sufficient, perhaps, that they agree that the facts are correctly stated, and that the deductions are warranted by them, even though not so perfectly established as to be beyond dispute. In truth, in our age and country, every man will judge for himself as to the inferences from the facts presented to him. If opinions are to be decided by authority among us, the committee do not deem that that authority is vested in them.

By order of the Committee.

JAMES JACKSON, Chairman.

SPASMODIC CHOLERA.

The subject of this report has been fully considered and discussed by many learned men of different nations in Europe. They have sought to throw light upon it by their researches into the writings of former ages, and they have carefully collected the observations which have been made on the present epidemic as regards its history, its nature and character, and as to the treatment best adapted to it. Their labors have been embodied in several valuable works, and the general results of them have been brought forward in a popular form in reviews and other writings. In this report there cannot be expected a statement of anything not known to those who have already studied the subject. Nor can it be expected that every circumstance in the history of the wide-spread epidemic should be brought into notice. It is not intended to repeat those references to, and quotations from, the writers of former times, which have already been often copied. It is designed, however, to give the statements necessary to a due understanding of the subject, and to make from them such inferences as shall seem to be legitimate.

In all ages diseases of the alimentary canal have been found frequent in warm climates; and the same in the warm seasons of temperate climates. In the discharges which attend those diseases, bile attracts the attention most strongly, its characters being much more marked, than those of the other natural secretions which find their outlet in the alimentary canal. Hence many disorders of the stomach and bowels have ordinarily been denominated bilious. One of these disorders has especially been distinguished as the bilious disease, or *cholera morbus;* and it was so named from the belief that it was caused by an

excessive secretion of bile. But in this disorder other important symptoms occur besides the discharge of bile. There attends it pain in the epigastrium, often extended over the whole abdomen; also more or less of general distress, with coldness, fainting and sinking, and occasionally spasmodic affections in the trunk and limbs. When this disease had become familiar to medical practitioners the original import of the name was in some measure disregarded; so that, even when bile was not discharged, if there occurred vomiting and alvine purging, with distress in the stomach, the disease was still called cholera morbus. This is an instance of the extension of a term beyond its original signification, such as is found to occur in all languages, both in common and in scientific use. It needs not for its justification in this instance the ingenious suggestion of a late learned author; that the very absence of bile is an evidence of derangement in the biliary function.

These remarks are designed to show the use which has generally been made of the term *cholera*. We have an instance analagous to this in the name affixed to one of the worst epidemics in our own and some other countries, viz. yellow fever. This name was given, no doubt, on account of the yellowness of the skin. But when it was found that, under the same epidemic disease, yellowness of the skin was wanting in the majority of cases, the name was still continued. It had become fixed by custom.

We are not then to be misled by a name, when this term *cholera* is applied to a disease, in which it is obvious that bile is not the cause, in which this fluid is seldom seen in the evacuations, and in which, when it is so seen, it is hailed as the evidence of safety, and may be thought even to promote that safety. Such is the case in the spasmodic cholera, which has occasioned so much just alarm in Asia and Europe.

From its extensive prevalence this disease has been called epidemic cholera; from some peculiarities of its character it has been called cholera asphyxia; from other characteristics it has been called spasmodic cholera; from its great fatality and overpowering violence it has been called malignant cholera; and from the place where it just appeared it has been called Indian and Asiatic cholera; while, from a more critical regard to its character, some persons have been disposed to withhold from it the name of cholera altogether. This name is, however, too well fixed to be changed, and the epithet *spasmodic* appears to be as well applied as any other, and has the advantage of having been the most extensively employed. In this

report, therefore, the epidemic disease, which is the subject of it, will be denominated *spasmodic cholera.* It will occasionally be mentioned as *the cholera* or *the epidemic,* when the connexion is such as will leave no room for mistake.

I. We commence our investigation by the inquiry, in what place and under what circumstances did this epidemic originate?

We look perhaps for too precise an answer to this inquiry; as if so great a pestilence must have been noted at its commencement with an accuracy commensurate to the importance it has since acquired. In our own country, in New England, how difficult should we find it, if influenza, measles or scarlet fever were prevalent, to decide where the disease began, and the precise course in which it spread at every particular period. When the epidemic under our consideration first arose among the ignorant natives of Indostan, the most enlightened could not anticipate its subsequent extension; to no one did it appear as altogether new, though its devastations might have been alarming; and those, who were in truth the first affected, had not the means of knowing that they were so, and had no reason to note and publish the circumstances in which they were placed.

The disease was first distinctly noticed in the low and wet country, embracing the outlets of the Ganges, in Bengal; and it is said to have commenced at Jessore, in that low country. It was observed, however, previous to this, during the same season, in various distant and more northern parts of Bengal and the adjacent provinces. It was at Jessore in August, 1817, and its occurrence there was especially noticed, on account of the great numbers affected by it and its extraordinary mortality. It is reported within a few weeks to have cut off more than six thousand of the inhabitants. From this time its course was observed with a good degree of care by the English residents, and especially by the medical officers in Indostan.

As many speculations have been and will be connected with the origin of this pestilence, as well as with its subsequent course through different countries, it may be well to quote here the account drawn up in 1820, 'by order of the government of Bengal, under the superintendence of the medical board, by James Jameson, assistant surgeon and secretary to the board.' This account was derived from a correspondence with the medical officers in all parts of the country first affected, and may be regarded as perfectly authentic.

'It is nevertheless certain, that nothing could be more erroneous than this notion of the local origin of the epidemic. For, not to speak of its frequent occurrence, so early as May, in some parts of Nuddeea and other districts already adverted to, it is quite clear from the statements of the medical staff, written separately and without interchange of knowledge or communication, that, more than a month previously to Jessore's becoming affected, the disease had begun to prevail epidemically in the distant provinces of Behar and Dacca; and that before the expiration of the first week in August, it had firmly established itself in many other parts of Bengal. Thus it is distinctly stated to have broken out in the city of Patna on the 11th of July; to have spread to the contiguous station of Dinapore, and the adjacent villages early in August; and to have remained without intermission in that neighborhood, until the end of January following. In like manner, after having in July appeared at Sunergong, a town on the banks of a branch of the great river Megna, it thence proceeded, visiting the *ghauts* or public ferries and grain markets in its way, to Nuraingunge and Dacca, where it arrived in the beginning of August. During the whole of July and August eight out of eighteen Police Departments into which Zila Kishnagur or Nuddeea, on the east side of the Hoogly, is divided, were also fully subject to its influence; and it had about the middle of the latter month even found its way to the remote province of Sylhet, which is separated from the eastern parts of Bengal Proper by the great rivers Ganges and Burumpooter. On the 23d of August we find it raging at Chittagong, far round the eastern corner of the Bay of Bengal; at the same moment in Rajshahy, a centrical district lying east of the Ganges; and not a week afterwards, in the high and distant tracts of Bhaugulpore and Monghyr. The exact date of its appearance in Calcutta has not been ascertained. But there is little doubt, that it visited some spots of the town and suburbs as early as the beginning of August; that it daily gained ground, and before the end of the month had widely spread its ravages, in a manner threatening to sweep off a large portion of the native population; and that in the early part of September, even the European portion of the community was no longer secure from the concentrated activity of the poison.

'These facts are more than sufficient to show the fallacy of every theory, which attempts to derive the disease from any local source; or to trace it to any one particular spot, as the centre from which it was emitted to the surrounding countries. They prove, without the possibility of dispute, that it broke out at very remote places at one and the same time, or at the distance of such short intervals, as to establish the impossibility of the pestilential virus being, in this stage of its progress, propagated by contagion, or any of the other known modes of successive production; and that its general diffusion was therefore referrible to some cause of more universal operation.

'Soon after the middle of September, the disease, now strictly epidemical, extended itself in every direction; within the space of a few weeks stretching from the most easterly parts of Poorneea, Dinagepore, and Sylhet, to the extreme borders of Balasore and Cuttack; and reaching from the mouths of the Ganges nearly as high as its junction with the Jumna.

'Within the area of several thousand miles, thus in so short a period brought under its influence, few towns or villages of any considerable size wholly escaped its attacks; almost every spot being, notwithstanding the great irregularity of its course, and waywardness of its approach, sooner or later, and in a greater or less degree, subjected to its dreadful visitations. The cities of Dacca, and Patna, the towns of Balasore, Burrisaul, Burdwan, Rungpore, Malda, Bhaugulpore, Chupra, and Moozufferpore, with the military stations of Monghyr, Buxar, and Ghazeepore, all suffered severely: and throughout the whole extent of the Delta of the Ganges, and more especially in the tracts bordering on the Hoogly and the Jellinghy Rivers, so great was the mortality, that the bulk of the whole population was sensibly diminished by the dreadful ravages of the distemper. It is remarkable, that the large and populous city of Moorshedabad, from extent and local position apparently very favorably circumstanced for the attacks of the epidemic, should have escaped with comparatively little loss, while all around was so severely scourged.

'It has already been shown, that, so long as the epidemic was confined to the province of Bengal, it at once raged simultaneously in various and remote quarters, without displaying a predilection for any one tract or district more than for another; or anything like regularity of succession in the chain of its operations. As yet, too, some of the peculiarities subsequently developed by it, and so unerringly marking its progress throughout the Upper Provinces, that they came almost to be considered as laws of the disease, had either not been called into existence, or were still of such feeble and uncertain operation, as to remain unobserved among the accumulated horrors of its attacks. Thus, although there was the same violence in the commencement, and rapidity in the progress, of its visitations, they were yet unmarked by that earliness of declension, and entire subsidence, which afterwards generally formed so consolatory a part of their revolutions. Nor could a town or tract of country, after having once fully undergone the scourge, yet congratulate itself on a probable immunity from its further assaults. For, although generally milder in form, and less fatal in the latter period of its existence, it rarely altogether disappeared; but seemed rather to keep hovering in the vicinity, as if in mere expectancy of some fresh cause to recommence its attacks with renewed vigor.

'The only spots on the eastern side of the Ganges, beyond the precincts of Bengal, attacked by the epidemic in the autumn of

1817, were Moozufferpore, and Chupra, the principal stations of the Tirhoot and Sarun districts; and the cantonment of Ghazeepore; and in each of these places its attacks were confined to the towns themselves, or villages in their immediate vicinity: the great bulk of the adjoining country, at this period, entirely escaping the disease.

'And now the epidemic began to show one of the most striking peculiarities which characterized its march. It no longer pushed its influence, without distinction or apparent choice, in all directions, and throughout every tract coming in its way. It began to affect particular lines, and to fix itself in particular divisions of country; wholly restricting itself for the time to the course of those lines and divisions. Instead of shooting up from Moozufferpore, Chupra, and Ghazeepore, through the contiguous districts of Gorruckpore, and Jiounpore, to the provinces of Oude and Rohilkund, it wholly left that part of the country; and for many months confined itself to the tracts lying west of the Ganges and Jumna. Thus, from the beginning of November, when it quitted Moozufferpore, until the end of March, when it broke out in Allahabad, on the junction of the Ganges and Jumna, it does not appear, that any one spot of the immense tract stretching to the east of these rivers from the northern point of Saharunpore to the southern boundary of Tirhoot, was visited by the disease. It will be afterwards seen, that from Allahabad, a new stream of the pestilential virus, now apparently propagated by regular succession, issued in various directions, and made a great part of this tract suffer for its previous immunity.

'Although the epidemic would seem to have beset Zila Mirzapore, and to have slightly appeared at Oonchara, and in the camp of His Majesty's 17th Regiment of Foot, and of the 2d Battalion 8th Regiment Native Infantry, at Mongawa, near the northern extremity of Rewa, about the middle of November; it did no great mischief, until in the end of the first week of that month, it reached the centre division of the Grand Army, then encamped, under the personal command of the Marquis of Hastings, near the banks of the Sinde in Bundlekund.

'It was here that the disease put forth all its strength, and assumed its most deadly and appalling form. It is uncertain whether it made its first approaches on the 6th, the 7th or the 8th of the month. After creeping about, however, in its wonted insidious manner, for several days among the lower classes of the camp followers; it, as it were in an instant, gained fresh vigor, and at once burst forth with irresistible violence in every direction. Unsubjected to the laws of contact and proximity of situation, which had been observed to mark, and retard the course of other pestilences, it surpassed the plague in the width of its range; and outstripped the most fatal diseases, hitherto known, in the destructive rapidity of its progress. Previously to the 14th, it had overspread every part of the camp; sparing neither sex nor

age in the undistinguishing virulence of its attacks. The old and the young, the European and the Native, fighting men and camp followers, were alike subject to its visits; and all equally sunk in a few hours under its most powerful grasp. From the 14th to the 20th or 22d, the mortality had become so general, as to depress the stoutest spirits. The sick were already so numerous, and still pouring in so quickly from every quarter, that the medical men, although night and day at their posts, were no longer able to administer to their necessities. The whole camp then put on the appearance of a hospital. The noise and bustle almost inseparable from the intercourse of large bodies of people, had nearly subsided. Nothing was to be seen, but individuals anxiously hurrying from one division of the camp to another, to inquire after the fate of their dead or dying companions; and melancholy groups of natives bearing the biers of their departed relatives to the river. At length, even this consolation was denied to them; for the mortality latterly became so great, that there was neither time nor hands to carry off the bodies; which were then thrown into the neighboring ravines, or hastily committed to the earth, on the spots in which they had expired, and even round the walls of the officers' tents. All business had given way to solicitude for the suffering. Not a smile could be discerned, nor a sound heard, except the groans of the dying, and the wailing over the dead. Throughout the night especially, a gloomy silence, interrupted only by the well known dreadful sounds of poor wretches laboring under the distinguishing symptoms of the disease, universally prevailed. The natives, thinking that their only safety lay in flight, had now begun to desert in great numbers; and the highways and fields for many miles round, were strewed with the bodies of those, who had left the camp with the disease upon them, and speedily sunk under its exhausting effects. It was clear, that such a frightful state of things could not last long; and that unless some immediate check were given to the disorder, it must soom depopulate the camp. It was, therefore, wisely determined by the Commander in Chief, to move in search of a healthier soil, and of purer air. The division, accordingly, on the 13th, marched in a southeasterly direction towards Talgong, and Sileia; and after several intermediate halts, on the 19th crossed the clear stream of the Betwah, and upon its high and dry banks at Erich, soon got rid of the pestilence, and met with returning health. But its line of march, during the whole of this progressive movement, exhibited a most deplorable spectacle. Although every means had been taken, by giving up the ammunition carts, and collecting elephants and draught cattle, to procure sufficient carriage, the sick were found too numerous to be moved, and were in part necessarily left behind. And as many who left the carts, pressed by the sudden calls of the dis-

ease were unable to rise again; and hundreds dropt down during every subsequent day's advance, and covered the roads with dead and dying; the ground of encampment, and line of march, presented the appearance of a field of battle, and of the track of an army retreating under every circumstance of discomfiture and distress. The exact amount of mortality during these few calamitous days could not, from the circumstances of confusion and general disorder, under which it took place, be ascertained with any degree of accuracy. From the military returns, however, it appears, that in this fatal week, of 11,500 fighting men of all descriptions, 764 fell victims to the disorder; and of the camp followers, it was conjectured, that about 8,000, or one tenth of the whole, was cut off.

'From the division having shaken off the disease, shortly after reaching the elevated and salubrious banks of the Betwah, it was generally believed, that it owed the recovery of its health solely to its change of ground and climate. But, without denying the salutary effects of such change, it may be reasonably doubted, whether the epidemic could have existed much longer in camp, even had it remained stationary on its original site. For from this time forward, it began to evince that rapidity in its revolutions, and inaptitude to remain long in one place, which almost invariably characterized its future progress; and as will be hereafter seen, in no one of the several camps subsequently visited by it, did it continue in full vigor for more than ten or fifteen days.'*

Thus far we have every reason to believe with Mr Jameson that the disease did not spread from one part of the country to another by contagion; or, if this was true in some portions of the widely extended region in which it prevailed; it was not so generally. It is as easy to conceive that it should arise, *de novo*, in many different cities and villages similarly situated, as in one alone; and this seems actually to have been the case.

But in 1818, without leaving the provinces already affected, the disease began to spread more widely; and now its extension seemed to be governed by fixed laws, which have been found to operate from that day to this. Diverging in different directions it passed in lines through the adjacent countries. These lines followed in the course of rivers in some instances, the great roads in others, and were determined perhaps by the course of armies in others. The disease did not however always follow strictly in the course which this description might imply, nor did it always travel at an equal pace. Generally, where large numbers were collected, it invaded them with severity, and affected a larger proportion of them, where the population was

* Jameson on Cholera Morbus, pp. 5–18.

most crowded. It seldom remained long in one place, its ravages continuing from two to six weeks, ordinarily, and almost never so much as three months. Its invasion was usually sudden and its onset violent; a large proportion of those attacked dying for the first week or two. Then it became more mild and would often cease very suddenly; especially after any remarkable and favorable change of the weather. It began its ravages in the rainy season,* and continued them quite into the cold season in 1817; afterwards it was generally worst in the warm season, though it often continued into the rainy season. It avoided the hilly country in a good measure, seeming to be arrested especially by a range of mountains. But the high grounds did not altogether escape its visitations, and after a long prevalence it found its way through the passes of the most mountainous regions and spread itself in the valleys beyond. When the natives of India and Europeans were together, whether in cities or camps, it usually appeared first among the former and among them was more fatal than among the latter. This may have been owing to their habits of life, for everywhere it has been most ready to seize upon and to destroy those who suffer the miseries and privations of poverty.

II. What are the symptoms of the spasmodic cholera, their course and order?

In the description of the disease there is very little difference among those who have been conversant with it. The following is a general statement of the symptoms and their course.

There take place vomiting and purging, in which the ordinary contents of the alimentary canal are very effectually and very rapidly evacuated. Then ensue copious and frequent discharges from both stomach and bowels, not of the ordinary secretions found in those organs, but of a thin turbid fluid commonly colorless, having some small opaque masses floating in it. These evacuations are preceded and accompanied by remarkable constitutional affections. At first there are general feelings of indisposition; or there are still more remarkable evidences of disease in the countenance and general appearance, which are easily recognised by the experienced physician, when the patient is scarcely aware of his own change. The patient only acknowledges some ill feelings of an indefinite character and such as seem common to many ordinary diseases; or he complains of a partial deafness, with some giddiness

* See Appendix, A.

or even actual vertigo. There is, however, manifested, if not expressed by him, a sense of anxiety, such as arises from a physical rather than a moral cause; and some acute observers have thought that this is always to be discovered among the precursory symptoms, when opportunity is afforded of witnessing them. But how far this is true, universally or even generally, it is not easy to decide, because few patients are under the eye of a skilful observer at this period; and further, because a large proportion of seizures occur in the night. Despondency of mind and often a sullen despair are very commonly noticed after the confirmed state of the disease has commenced. Immediately after the first evacuation and sometimes before any, a sudden prostration of strength ensues. The patient can no longer stand, and exhibits many of the symptoms of the first stage of a violent fever. He has an extreme coldness, with a remarkable shrinking of the whole body, most especially noticed in the countenance; also with a loss of all natural color and a lividity in the extremities. The pulse gradually sinks until it can no longer be felt at the wrist. The sense of faintness and of exhaustion at the stomach is extreme. Cramps and spasmodic affections ensue in the limbs and subsequently in the trunk, attended by violent distress and pain. The pain often causes the most courageous to make noisy outcries and to roll themselves about as if frantic. But separate from the agony of pain the patient suffers an anguish, referrible to the heart, which is probably equal to any physical misery men are called to endure. This anguish is perhaps the same in kind which arises from affections of the heart induced by various causes, from moral emotion, from sympathy in sudden and violent injuries, from inflammation in or about the heart, or from embarrassment, when it is the seat of an organic disease. In this instance it is connected with that sudden failure in the functions of this organ, which constitutes an important and characteristic part of the cholera. The tongue is moist, but greatly altered in its appearance, shrinking and growing pale like the skin. Within, there is a sense of great heat, and this is accompanied by an unconquerable thirst and craving of cold water. The secretion of urine fails, while there exudes from the skin a clammy and cold sweat. The heat deserts the surface, and yet the patient can rarely be induced to allow his body to be kept covered. At length the respiration becomes labored in many instances, while even the heart can scarcely be felt to pulsate. In the confirmed state of the disease the countenance acquires a peculiar character, so that it has been called the cholera countenance.

It has been also called the triangular face. 'It is difficult to be described, but it bears a striking resemblance to the appearance of *age;* and seems to arise from the paleness, wasting and shrinking of the features, and the depressed and disturbed state of the mind, conveying into the countenance a strong expression of care, anxiety and alarm.'* A peculiar and strong odor is often perceived from the body of the patient. Sometimes the air expired from the lungs is sensibly cold; and Dr Davy states that the lungs give out less of carbonic acid in the air expired than in health. The tongue becomes cold and often shrivelled. At a late period, in severe cases, the skin assumes the feeling of a wet hide. Meanwhile, the intellect is unimpaired and the senses very nearly so; although the failure otherwise is so great as to transform the patient in a short time to the appearance of a 'living corpse.' A few hours suffice to make him a real corpse.

The disease in India often destroyed life in two or three hours. Indeed the patients there sometimes fell down and expired almost at once, when it had not before been noticed that they had been invaded by the disease, though probably it might have been noticed had attention been called to them. Death was very rarely protracted beyond thirtysix hours. Or, at least, if it occurred at a later period it was after a different course of symptoms. When the disease does not prove fatal, relief takes place spontaneously within thirtysix to seventytwo hours, in most instances; and by aid of remedies it is often obtained much sooner as well as more certainly. But sometimes the convalescence is slow, the constitution having suffered greatly by the violence of the disease. This was noticed in India. In Europe it has been observed, much oftener than in India, that continued fever, with a low typhoid character, has ensued upon the first disease, and continued for an indefinite period; not unfrequently proving fatal. In India fever of a bilious character did occasionally ensue. In these cases the whole disease may perhaps be regarded as a fever, commencing with remarkable coldness and prostration, and accompanied by the local derangement of the stomach and bowels. To form an adequate idea of the disease a more detailed account of it is necessary. For this purpose it may be divided into different stages, although these may not always be recognised distinctly. We cannot perhaps make these known in any way better than by quoting the following graphic description from Mr George

* Orton, as quoted in Johnson's Med. Chir. Journal for Jan. 1832. p. 194.

Hamilton Bell, who wituessed and studied the epidemic in India for several years. The latter part of the quotation contains some particulars, besides the description of the different stages of the disease, which are confirmed by other writers.

'In describing this disease I reckon four stages : —

'1. The invasion of cholera is so insidious, that the individual attacked may be quite unconscious of the presence of the first stage of it. Generally speaking, indeed, it is only to be detected by those well acquainted with the disease, and by careful observation. Not only in this stage, but throughout the whole course of the disease, the appearance of the countenance is one of the most highly characteristic symptoms. An intimate friend, perhaps, observes, that the person attacked has an expression of anxiety, that his complexion is unnaturally earthy, and that his eyes seem sunk in his head. In reply to inquiries, the patient will perhaps deny that he is unwell: he may say, however, that he is a little deaf; and if minutely questioned, he may admit that he has indescribable sensations of being out of order, and that he is unaccountably depressed and listless : he may have no nausea, but he has tormina of the bowels, and perhaps an uncomfortable sensation of heat at the pit of the stomach ; the pulse will be found quick and weak, (*I have never found it have the febrile throb ;)* the hands and feet feel cold : the nails are blue, and he has had one or more unnatural alvine discharges. The first of these is generally characteristic; there is a sudden call, and the whole intestines seem to be at once emptied, followed by a feeling of weakness.

'Thus, " while the servant (a Hindoo) of Captain H. was bringing in breakfast, his master was struck with his appearance, and asked him what ailed him ? he replied he had nothing to complain of but deafness, which he ascribed to sleeping in the cold night wind. His master, alarmed at his looks, sent him to the hospital tent, (the epidemic was prevailing in the camp to which this gentleman belonged): on minute examination the man was found to have had some suspicious stools, his pulse had sunk, his skin was cold : He had cholera, and became rapidly worse ; and though he was put immediately under treatment, and was a man of good habits, and strong constitution, he had a hard struggle for his life."

'It is unfortunate that the first stage of cholera is only to be discovered by the most experienced eye ; and that even when the patient himself has a suspicion of his condition, the risk of exposing himself to ridicule, from its being a " false alarm," may keep him silent, while the acknowledgment of his fears might have been the means of saving his life. It is to this insidious approach of a malady at all times so mortal, that, in part at least,

must be ascribed its being so alarmingly destructive on its first breaking out at a station ; patients being extremely apt to allow it to go beyond remedial means before they seek assistance.

'2. The second stage of cholera is more decidedly characterized : The pathognomic appearance of the countenance, to those who have ever seen the disease, is no longer doubtful ; the eyes are sunk in the head, the lips are blue, there is a ghastly look about the mouth, and the whole features are shrunk. The patient does not now deny being unwell ; he acknowledges having passed some peculiar stools, and probably has had vomiting ; these have been followed by great prostration of strength : there is tinnitus aurium, often slight deafness and vertigo ; the pulse is more decidedly affected, it is weak and thready ; the skin is cold ; there is much thirst, and a burning pain at the pit of the stomach ; but the tongue is not dry—it is moist and white. When the ratio symptomatum of the disease is under consideration, it will be necessary to take particular notice of the fluid which is passed from the stomach and bowels ; at present it is sufficient to say, that it is not alimentary, or excrementitious ; it is either a homogeneous and almost limpid, or a turbid fluid ; or is like water in which grain has been boiled, with pieces, more or less numerous, of opaque white or yellowish coagulated matter floating in it. The manner in which the discharges take place is characteristic — the desire is sudden, unaccompanied by griping or nausea, and the stomach or bowels are emptied at once, and with some violence : the gastric and intestinal evacuation are similar in their appearance and nature.

'3. In the third stage, the appearance of the countenance is still the most prominently characteristic symptom. The eyes, surrounded by a dark circle, are completely sunk in the sockets, the whole countenance is collapsed, the skin is livid, and the expression so altered, that the patient's most intimate friend can hardly recognise him. The surface is now generally covered with a cold sweat, the nails are blue, and the skin of the hands and feet is corrugated, as if they had been long steeped in water ; the sensibility of the whole surface is deficient, but it is by no means uncommon for patients to complain of a burning heat in their *cold* skin. Vesicatories do not act ; even boiling water does not raise a blister. The voice is hollow and unnatural. If the case be attended with spasms, the suffering of the patient is much aggravated, and is sometimes excruciating. The spasms commence in the hands and feet like cramp ; they stretch up the limbs to the trunk, which however they do not always reach. In some cases again the muscles of the abdomen are principally affected, and they are drawn towards the spine during the whole course of the disease. These spasms may have commenced early in the disease, being on some occasion the

very first symptom. The discharges from the stomach and bowels are at this stage very irregular; in some cases they are still very frequent, in others, after one or two evacuations, they wholly cease. The pulse at the wrist, if it have not ceased, is scarcely perceptible, and the heart is beating feebly; and when the spasms are severe, they frequently, even though the pulse be still quite distinct, stop it during the paroxysm. The same effect is produced by excessive vomiting. The breathing is slow and often oppressed: this also sometimes occurs early in the disease; the exhaled breath is cold; and though the heat of the body is some degrees below the standard, the patient throws off the bedclothes, and beseeches the bystanders to allow him cool air and cold water. Hickup is not an uncommon symptom.

'4. In the last stage the intestinal evacuations have most likely ceased; the eyes, completely sunk in their orbits, are glazed and flaccid, turned upwards, and half-covered with the eyelids; the spasms are now commonly at an end; the extremities, indeed the whole body, is that of a corpse, and the impression communicated by the skin has been well likened to that of "a damp hide;" every artery has ceased to pulsate, and the action of the heart if perceptible is a mere flutter; the whole body is bathed in a cold and clammy sweat: it is painful to witness the oppression of respiration and jactitation of the sufferer. The dying man can still be roused, but when undisturbed he generally appears in a state approaching to stupor; and though often in a humor which might almost be termed sulky, is in most cases coherent to the last. These symptoms are the immediate forerunners of death.

'If blood be drawn during the progress of the disease, it is found in the outset dark-colored; as the case advances, the blood becomes thick, there is a deficiency of serum, it coagulates quickly, and does not assume the buffy coat. In the last stage of the disease the current in the veins has stopped, and the blood is so grumous that it can scarcely be forced out, in the smallest quantity, through a large orifice.

'The whole course of these stages, generally speaking, does not exceed sixteen hours, and unluckily the practitioner is seldom called in until the first, and part of the second stage have passed. The period consumed by each of the above artificial divisions, varies in every case. I have seen instances in which death ensued in less than four hours after the commencement of the disease, and others in which its latter stages, with the pulse quite imperceptible, had already lasted a whole day.

'The condition of the mind is remarkably collected during the whole progress of this terrible illness; for though patients, as the malady advances, are unwilling to be disturbed with questions, this appears rather to result from the want of physical energy

than from any intellectual failure. Indeed, as the fatal event approaches, the only wish a patient seems to have is to be allowed cold water, and to be left to die in peace. It has been well said, that a patient in the last stage of cholera may be called " a living corpse."

' A curious phenomenon has been several times observed : — After a patient has been some time to all appearance dead, and when the attendants were dressing the corpse, spasmodic twitches have taken place in the limbs, having in some instances even extended to the muscles of the body, and general spasmodic contractions have supervened. This peculiarity, it is believed, has also been observed in Russia.

' Cases often occur in which one or more of the above detailed symptoms do not appear. There may be no spasms ; the vomiting and purging may early cease, or there may have been only one large alvine discharge, followed by a mortal collapse, the patient seeming to be at once struck with death ; and though, on the very first appearance of the disease, he has *walked* to the surgeon, his pulse is found to be gone, his heart has ceased to beat, blood can be got only by drops from the veins, he lays down his head, and dies without a complaint.

' These anomalies are not confined to individual instances, but are found to occur, as Mr Scott well expresses it, in " local epidemic visitations." Thus, he says, " when the disease appears epidemically in a town or district, or in the lines of a corps or the camp of a marching regiment, it may on one occasion be distinguished throughout, by the absence of vomiting, and the prevalence of purging ; and on another, by the excess of vomiting, and, though more rarely, by the absence of purging. Spasm may be generally present in one instance of invasion ; in another, it may not be distinguishable."

' I was on one occasion called upon to send assistance to a district in which the disease was thus described to exist. " It commences by attacking the sufferer with an agonizing heat in the stomach, vomiting and purging, and lock-jaw ; death ensues in two hours, and often more rapidly : it bids defiance to every remedy." [Extract from letter of the Honorable Mr Harris, Principal Collector, Soonda.]

' But in all cases there are *the collapsed countenance, blue lips and nails, shrunken fingers, the total failure of the usual secretions, deficient animal heat, suspension of the pulse, and remora in the venous circulation.*' *

III. What are the appearances which have been discovered after death in those, who have sunk under the spasmodic cholera ?

* Bell on Cholera, pp. 10–17.

As regards the material points there is no discrepancy in the reports of the medical men who have studied the pathological anatomy in this disease. Persons attacked by it could not be supposed to be, all of them, free from previous disease. On the contrary, in the trying climate of Indostan, many Europeans were already affected by organic diseases, before they were attacked by cholera; and it was in them more than in the natives that post mortem examinations were made. In estimating the changes wrought in the body by this disease, the occasional degenerations are not to be taken into the account, but those only which were discovered in the great majority of cases. These may be said to have been few and simple; but they are such as are more immediately connected with the phenomena during life, than in most cases of disease; which happens from this obvious cause, viz. that the disease is so brief and rapid in its course as to give no time for complicated and successive internal changes.

The face, the limbs and the whole surface are shrunken and livid. There is an appearance of emaciation, such as might at first be attributed to a slow and wasting disease. But we suspect that this is not owing to an absorption of fat, as in chronic disorders. It may be attributed in part to a strong contraction of the muscles; but much also to a draining of the fluids. The capillary vessels, as well as the veins of the limbs and of all the external parts, appear to have given up their blood before death.

The vessels of the brain have been found full, though not uniformly. Generally it is in the veins that this fulness has been most noticed; but in some cases the arteries also are distended. Sometimes a serous effusion has been found in the arachnoid cavity or under the arachnoid; and not uncommonly the fluid at the base of the cranium has been found to extend into the vertebral cavity. Very rarely has any unusual serous effusion been found in the ventricles.

In the thorax the lungs are found much loaded with blood; and this in such a manner that the accumulation has been thought not to have occurred after death, but to have been owing to a congestion during life. Such however is not uniformly the case; for in some instances the lungs have been found quite in their natural state; in some they have seemed to have a fleshy structure and in others they have changed only in being remarkably shrunk, or contracted. In these last it would be supposed that there would be air in the cavities of the pleura; but we are told that it has been proved by experiment that this has not been the case.

The heart has been found, in almost all cases, distended with blood on the right side, in both its chambers; and sometimes the left auricle and ventricle are more or less loaded with the same black blood, which appears elsewhere. This blood has even been found in the ascending aorta. The veins leading to the heart are uniformly, or nearly so, much distended with blood. The blood in the heart and in the surrounding vessels has very frequently undergone a separation, so far as that much pure coagulable lymph is attached to the clot. In other words, there are formed there what are denominated polypi. To these much importance has been attached by a learned and ingenious physician of Moscow, Dr Marcus.

Generally the blood has been found dark colored, as already mentioned; imperfectly coagulated, though thick; and deficient in serum. So far common observation has gone. Mr Herrmann of Moscow, who is spoken of with great respect, has made known some observations on the blood and other fluids in cholera, which may deserve consideration. It should be observed however that his doctrines, in respect to a free acid in healthy blood, are at variance with those of the best chemists.

'REMARKS ON CHOLERA MORBUS.

[Extracted from a Letter of Mr R. Herrmann, of Moscow.]

'1. The fluids voided by stool and vomiting contained, besides water, some acetic acid, a small quantity of osmazome, salivary matter, butyric acid and mucus. They resemble very much gastric juice, but do not contain any free muriatic acid. In the alvine discharges, the quantity of butyric acid is greater than in the fluid voided by vomiting, and they contain, besides some albumen, a fetid, oily matter, and a small admixture of bile.

2. The bile of the cholera patients contains the same ingredients as that of healthy persons; it is, however, more concentrated.

3. The secretion of urine ceases almost entirely during the disease. The urine which first re-appears, when the disease has been overcome, contains less urea, and less of the other solid ingredients, than the urine of healthy persons.

4. The blood undergoes considerable changes during the cholera. According to Mr Herrmann, the blood of healthy persons contains carbonic and acetic acids, in a free state. The blood of the cholera patients contains much less acetic acid, and the quantity of the crassamentum, relative to the serum, is much greater than in healthy persons; and the increased relative quantity of the crassamentum was found to be in direct proportion to the aggravated nature of the disease.

The blood taken from a patient two hours before his death contained 62.5 per cent. crassamentum, and 37.5 per cent serum of sp. gr. 1.036 re-acting alkaline upon litmus papers. The blood of a healthy person, treated in the same manner, gave 43 per cent crassamentum, and 57 per cent serum, of specif. gr. 1.027, re-acting acid on test papers.

Mr H. concludes, from his experiments, that the change of the composition of the blood is effected by a part of its ingredients being abstracted by the discharges by stool and vomiting, and that the blood, by parting with its acetic acid and a part of its watery particles, acquires that greater consistency and that tendency of separating its fibrine, which is observed during the disease.

Dr Jaenichen, in his numerous dissections, found invariably fibrine separated in the heart, forming polypous masses, partly obstructing the arteries.

5. Mr H. found the air, immediately surrounding the patient, to contain a substance, which, when deposited upon cooled surfaces, resembled animal mucus. It did not re-act upon test-papers, and was precipitated by sugar of lead and tincture of galls, bearing great analogy to the substance which Moscati separated from infected air.'

In the Lancet, published in London, of Dec. 31, 1831, we have the following account from a different source.

'EXPERIMENTS ON THE BLOOD IN CHOLERA.

To the Editor of the Lancet.

'SIR,—Having been enabled to complete the experimental inquiries in which I have some time back been engaged in Newcastle-upon-Tyne, I beg you will have the kindness to give insertion to the annexed outlines of the results I have obtained:—

1. The blood drawn in the worst cases of *the* cholera, is unchanged in its anatomical or globular structure.

2. It has *lost a large proportion of its water*, 1000 parts of cholera serum having but the average of 860 *parts of water.*

3. *It has lost also a great proportion of its* NEUTRAL *saline ingredients.*

4. *Of the free alkali contained in healthy serum, not a particle is present in some cholera cases, and barely a trace in others.*

5. Urea exists in the cases where suppression of urine has been a marked symptom.

6. *All the salts deficient in the blood, especially the carbonate of soda, are present in large quantities in the peculiar white dejected matters.*

There are other results of minor consequence, to which I will not at present allude, neither shall I *on this occasion* offer any ob-

servation on the practical inference to which my experiments may lead. In a few days a detailed report shall be published, in which the mode of analysis, &c, will be minutely described. It will be found, I regret to say, in every essential particular, to contradict that recently given by Herrmann. All my experiments, however, have been publicly performed, and can be authenticated by numerous witnesses, a precaution I thought it necessary to adopt, lest it might be supposed that I impugned, without sufficient foundation, the accuracy of the Moscow professor.

May I add, that until the publication of my report, I shall deem the suspension of discussion on the results now introduced as a matter of personal courtesy and obligation.

I am, Sir, your obedient servant,

W. B. O'Shaughnessy, M. D.

London, 28th December, 1831.'

In the abdomen the viscera *in sitû* exhibit no unhealthy appearance. Sometimes, indeed, there is a deep color visible in the small intestines, especially in the ileum; and not unfrequently there is an unequal distention of the intestines; in one part a close contraction and in another an unusual dilatation. One observer found several instances of intus-susception, the parts retaining their natural character, as to color and texture.

On more close examination the veins of the abdomen generally, and those of the mysentery especially, are found to be distended. Also, the vessels of the liver are engorged with blood. The gall-bladder is usually distended with dark colored bile.

On opening the alimentary canal, there are sometimes found in the mucous membrane marks of irritation, rather than of inflammation. Or, perhaps, these marks arise only from the distention of the vessels continued to their minute branches and to the capillaries. Patches of this description are seen in the stomach, but more frequently not; and they are not different, probably, from the ordinary appearances in this organ. But in the small intestines they are more constant and more strongly marked. In the duodenum and jejunum it is often a blush only; but in the ileum it is a dark and almost a black surface, which the mucous membrane presents. This appearance is sometimes such as to have been regarded as a gangrene of the part; but the texture shows it not to be so. Whether discoloured or not, there is a fulness in the mucous membrane of the small intestines in most cases; a change not unlike that produced by maceration after death. In some instances, however, there are found unequivocal marks of inflammation in the mucous mem-

brane of the alimentary canal; and rarely gangrene is found. In the Bengal report, the appearances of inflammation are mentioned more frequently than in the other accounts from India, or in those of Europe. The same remark would apply to inflammation within the cranium. Likewise effusion of blood in both the head and the stomach was observed in Bengal.

The intestines, especially the small intestines, generally feel pulpy, or dough-like. The contents of the stomach vary according to the articles received into it during life, and its greater or less ability to retain these. The intestines contain no feces, but are filled with fluids, such as are discharged from them during life. It is in the small intestines, especially, that there is found the serous fluid, with a glairy, tenacious matter and with flaky masses, which characterize the alvine discharges in cholera. These matters are often of a dark gray color, sometimes of a greenish tinge; and, not unfrequently, they are in such quantity as to fill up the canal at particular parts.

The kidneys are healthy, exhibiting, however, the venous congestion common to all the great organs. The urinary bladder is uniformly found empty and contracted, when death takes place from simple cholera. Its inner coat is covered with mucus like that of the intestines. When the disease is much protracted, the appearances vary in many respects, but not in any uniform manner.

The foregoing is collected from various original sources. That our readers may feel assured in regard to this subject, we shall here add two long quotations, one from Mr Scott, who saw the disease in India; the other a translation from the work of M. Briere de Boismont, who saw the disease in Poland.

'The external appearance of European subjects, who have sunk under cholera, closely resembles that which has been noticed as taking place during life. The surface is livid, the solids are shrunk, the skin of the hands and feet is corrugated. There seems no sufficient evidence of any uncommon tendency in the body to putrefaction after death, nor of any characteristic fœtor from the abdominal cavity. No particular morbid appearances have been found in any of the cavities of the body, which are lined with *serous membranes*, or in these membranes themselves. The cavities of the pleura, the pericardium, and of the peritoneum, have almost uniformly been found in a natural state; or the deviations from that state have manifestly had no connexion with the cholera. The surfaces which are lined, or covered with *mucous membranes*, have, on the contrary, very generally exhibited signs of disease. These will be noticed, as the organs connected with them come to be mentioned.

'The lungs have not unfrequently been found in a natural state, even in cases where much oppression of respiration had existed previously to death. Much more generally, however, they have been found either to be gorged with dark blood, so that they have lost their characteristic appearance, and have assumed more that of liver or spleen; or they have been found to be in the opposite state; that is, collapsed into an extremely small bulk, and lying in the hollow on each side of the spine, leaving the cavity of the thorax nearly empty. This appearance has been so remarkable as to induce Dr Pollock, of H. M.'s 53d regiment, to conceive, that it could only be produced by the extrication of a gas within the cavity of the pleura, capable of overcoming the atmospheric pressure. It is understood, however, that opportunities were had of piercing the thorax of the dead body under water, and that no gas was extricated. As there appears to have been an absolute vacancy in the cavity of the pleura, that is to say, the lungs did not by any means fill it, it would seem that that viscus had exerted a contractile power, adequate to overcome the pressure of the atmosphere. The blood found in the lungs has been always very black. The heart and its larger vessels have been found to be distended with blood, but not so generally as the apparent feebleness of their propelling power, and the evident retreat of the blood to the centre, would have led us to expect. The right auricle and ventricle being gorged with blood, is nothing peculiar to cholera; but some dissections have shown the left cavities to be filled even with *dark* or *black* blood, which we may reckon as a morbid appearance more peculiar to it. In the abdominal cavity, the peritoneal coverings of the viscera, being *serous membranes*, present in general but little deviation from the healthy state: occasionally, indeed, the morbid accumulation of blood in the vessels of the viscera, imparting an appearance of turgidity and blueness, is evident on their exterior surfaces. We also find them bearing marks of inflammation, especially where the patient may have lingered long before death. In other cases, the whole tube has had a blanched appearance, both externally and internally. The stomach and intestines generally preserve their ordinary volume. The appearance of the omentum is not sensibly affected in cholera. The stomach is found to be so variously affected as to destroy all grounds for pathological reasoning. It is very rarely found empty or much contracted after death, nor has any appearance of spastic stricture of the pylorus been often detected. It has, however, sometimes occurred. Its contents appear to be chiefly the ingesta in an unaltered state: in some cases, greenish, or yellow, or turbid matters are found. The stomach has been said to have been found "lined with calomel." Various appearances, either of active inflammation, or a congested state of the vessels, have been noticed, sometimes in one part, and

sometimes in another. The parts seem as if they were sphacelated, thickened, softened and friable; and, in short, exhibit so great a variety of appearances, from a perfectly natural state to the most morbid, that no particular light is thrown by them on the disease.

'The intestinal tube is sometimes collapsed, but oftener found to be more or less filled with air; distended in some parts into bags or pouches, containing whitish, turbid, dark, or green-colored fluid: and, in others, presenting the appearance of spastic constriction. The latter, however, is not common. No fœcal or other solid matters are found in the intestines; but, very commonly, large quantities of the conjee-looking fluid, or of turbid serous matter. The duodenum, and, occasionally, the jejunum, have been found loaded with an adherent, whitish, or greenish mucus; at other times they have been found seemingly denuded of their natural mucus: and often perfectly healthy. Traces of bile in the intestines, or of any substance apparently descended from the stomach, are exceedingly rare. Sanguineous congestion, and even active inflammation, are stated to be more common in the bowels than in the stomach; but, on the other hand, instances are very numerous where no such indications have been detected. The thoracic duct is stated to have been empty of chyle. The liver has been commonly found to be gorged with blood, but not always: it is an organ usually very vascular: and it would probably demand a nicer discrimination than has been bestowed on the subject, to distinguish the degree of congestion in which it is naturally left by the settling of the blood after death in ordinary diseases, from that which has been observed after an attack of cholera. The gall bladder has almost universally been found to contain bile, and, in the great majority of cases, even to be completely filled with it. As is usual with this secretion, in cases of retention, it is of a dark color. Very different states of the gall ducts have been described: cases of constriction and impermeability, seeming to be equally numerous with those of an opposite character.

'The urinary bladder is found, we may say universally, without urine, and very much contracted. The lining or mucous membranes of the bladder and ureters have been found coated with a whitish mucous fluid. The smallness of the bladder after death has been generally adduced in proof of great spasm: but it is not unfrequently found to be equally small after death from other diseases: and it seems the nature of that organ, when it contains no urine, to contract, so as to leave no cavity. Dr Baillie, in his morbid anatomy, thus notices this fact. "The bladder is also found contracted to such a degree as hardly to have any cavity. This is generally not to be considered as a disease, but simply as having arisen from a very strong action of the muscular coat of the bladder previously to death." The appear-

ance of the spleen, which is so various under the ordinary conditions of the body after death, has indicated nothing that can be mentioned as belonging to cholera. The vessels of the mesentery have been very generally found to be uncommonly full of blood.

'In the head, appearances of congestion, and even of extravasation, have been frequently observed; but not so uniformly nor to such extent as to require any particular notice. Only one case has been given where the state of the spinal marrow was examined; and, in that, indications of great inflammation were detected in its sheath; the case, however, was, in some degree, a mixed one.

'From this general view of the appearances found on the dissection of the bodies of persons who have died from cholera, it is manifest that the information thence derivable, is, in a pathological view, of a negative nature only. It is nevertheless of consequence, in a practical sense, especially in treating the sequelæ of cholera.'

Translation from the work of Briere-de-Boismont on the Cholera as it appeared in Poland.

Post-mortem appearances. The study of the symptoms has already thrown some light on the nature of the disease. Almost every one whom we have seen attacked by cholera has complained of a general uncomfortable feeling, an increased sensibility, a kind of trembling, weakness, noises in the ears, vertigo, dimness of vision and faintness. Are not these very evidently unequivocal symptoms of a change of function in the nervous system? These first symptoms are followed by others no less remarkable, showing a derangement of the digestive functions, as nausea, vomiting of thick, whitish, colorless matter, and dejections more or less of the same character. Change of function in the nervous system and in the intestinal mucous membrane are then the two first facts. Let us now see what is to be learned from post-mortem appearances, remembering that they are instructive only so far as they relate to symptoms, their causes and treatment.

Before relating the morbid changes we have found, two important observations may be made: firstly, that the cases most suddenly fatal leave no traces, or such as are scarcely appreciable, and that for satisfactory results we must look to those which have been of some duration; secondly, that such changes are not the same in every place where cholera has been epidemic, and that even in Warsaw differences were found in some cases. In that city the epidemic resembled those described by Drs Christie and Searle.

The appearances which first present themselves are lividity of the surface of the body and rigidity — these are observed in most cases. In a letter to Dr Jules Guérin, principal editor of

the Medical Gazette, and read before the Academy of Sciences on the 2d of May, I thus described the morbid changes in the first cases examined by M. Le Gallois and myself: 'the serous coat of the intestines was of a pink color; the blood which flowed from the vessels was generally liquid, dark and abundant; the spleen was small and soft; the liver healthy; the gall bladder was filled with a dark bile. In the stomach were spots and lines of a livid red; it was filled with a thick, yellowish white, viscid mucus, and the mucous membrane was easily separated. The upper portion of the small intestine contained a very large quantity of thick mucus like that in the stomach; as we proceeded downwards, the secretion became whiter and more consistent; sometimes it had a yellowish tint. The quantity of this secretion was very considerable. There was a partial vascular injection of the small intestine, an enlargement of the follicles over a rather large extent,* and some patches of a more or less deep red color; the intestines had a doughy feel; here and there were distinguished some small bodies which looked like grains of sand. In the large intestine also we found the thick, whitish, viscid matter, which in some places had a purulent appearance, and towards the end of the intestine a porraceous. The bladder contracted and slightly injected, contained in like manner this whitish mucus, as did the nostrils and the æsophagus; the lungs were congested; the brain injected and softer than natural; the blood was everywhere liquid in the cavities of the viscera.'

Such was the result of our first dissections; a greater number made since then enables us to point out some differences. Thus, in many cases, besides the thick, whitish, cream-like matter, we found a turbid, watery serum, colorless and inodorous, in which were not unfrequently suspended flakes of albumen. These two secretions did not always take place; they were wanting in many of the cases which we have reported, or were found but in a very small proportion. On the 13th of June, M. Sédillot examined the body of a person who died of cholera. The stomach and intestines showed the effects of violent inflammation; the stomach contained much blood, which, considering the state of the organ, Mons. S. did not hesitate to refer to the inflammation. The abdominal veins were filled with a liquid, oily blood. The bladder was strongly contracted, and contained not a drop of urine. He did not find, at least in any perceptible degree, the whitish matter so generally met with in the alimentary canal, which was probably owing to the violence of the inflammation.

In most of the post-mortem examinations, the viscera, the membranes, and the abdominal veins, are filled with blood. The mucous membranes, the liver, kidneys, mesenteric veins, vena-

* M. Dupuytren, who has for many years devoted himself to the subject of epidemics, first called the attention of physicians to changes in the secretory organs

porta, heart, lungs, the brain and spinal marrow, are principally subject to this congestion. This great determination to the interior of the body, and the enormous quantity of matter discharged or contained within the intestines, and which is shown to consist of very nearly the same elements as the blood itself, appears to us a very satisfactory explanation of the coldness of the surface, and the failure of the vital powers.

The whitish, cream-like, opaque, viscid matter, is found not merely in the alimentary canal, but in the æsophagus, in the nostrils, in the bladder, and, in many cases, in the bronchia. If the patient sinks rapidly, or has not had vomiting or purging, the secretion is frequently wanting.

The mucous membrane, though commonly it appears injected and inflamed, is also often found of a whitish color. In many cases we have seen dark and apparently gangrenous patches. We would not assign to inflammation the principal part in the production of this disease, and yet it cannot be denied that it often succeeds in complicating it. Is not this opinion strongly favored by the dryness of the tongue, the extreme thirst, the violent epigastric pains, relieved by the application of leeches and by baths, the good effects of venesection when there are signs of reaction? Was not the epidemic cholera morbus described by Sydenham, and so nearly resembling that which we have seen in Poland, relieved by soothing remedies?

The diseased appearances of the spinal marrow are sufficiently uniform; sometimes there is an evident quantity of serum in the canal, sometimes an effusion of blood, and sometimes a gelatinous exudation; more commonly the veins of the spinal column, and the membranes and substance of the spinal marrow, are strongly injected.

The liver was enlarged in many subjects of intemperate habits, but in the great number of cases it was little or not at all altered. The gall bladder often contained a thick, very dark green bile; in this epidemic, as in that at Indostan, this secretion was not formed, or was at least but rarely found. The turgescence of the liver observed in India, and the great quantity of bile found in the gall bladder, are sufficiently explained by the heat, which has a marked influence on these organs, as is shown in the case of most Europeans who visit that country. May not the absence of bile be explained by spasm of the ducts, or, still more satisfactorily, by the change which takes place in the nature of the secretions from the mucous membranes, which, according to the analysis of Dr Christie, contain the elements of the blood except the fibrine? — These secretions must then remove from the blood that portion which would undoubtedly have been used by the liver and kidneys, of which the functions, under cholera, seem very evidently to be suspended.

The bladder is almost invariably contracted and in folds; it

lies concealed behind the arch of the pubes, and contains no urine, but a whitish, viscid matter, the same as is found in the intestines; the case of the senator B . . . proves, however, that the bladder may contain urine. In the kidneys this liquid is equally wanting.

The heart, in a great number of cases, was not sensibly affected; sometimes it was soft and flaccid; the ventricles contained black, liquid blood, and we sometimes also found in them coagula. The brain was almost always gorged with blood; occasionally, serum was found in the ventricles, and in many cases also at the base of the brain.

The blood, in cases of cholera, undergoes remarkable changes; it becomes dark, thick, and viscid; it often forms a compact mass, and is with great difficulty separated into serum and clot. The quantity of serum appears evidently to diminish as the disease goes on; the blood contains at first a certain quantity, but after some time there is no longer any to be discovered. When we visited the hospital at Mienia, many of the patients had just been bled, and we remarked that, in the greatest number, the blood flowed with difficulty or even stopped altogether, so that they were obliged to open a second vein or use the bath; the blood was black, viscid, oily, and on cooling did not coagulate. In the examinations we made we also remarked that, in the abdominal veins, where it was found in abundance, the blood was dark, thick, and viscid, and being collected in a vessel, it had a gelatinous appearance. The blood, however, has not constantly this viscid, thick character: in many cases we have found it liquid, and of a brown color. The blood, the bile, the urine, and the matter vomited, have been analyzed at Warsaw; nothing very remarkable, however, was discovered, except that the urine contained less water and urea, and the blood much less serum than usual. Dr Christie had before this ascertained in the matter vomited the existence of the elements of the blood except the fibrine. Dr Orton, in his treatise on the epidemic diseases of India, says that the blood coagulated with difficulty, and sometimes not at all. At Bombay and Ceylon it was observed that the venous and arterial blood had the same physical characters, and that no appearance of fibrine was found in what was drawn from the veins; there was, indeed, so little tendency to coagulate, that, when venesection was performed, great care was requisite to insure stoppage of the blood. Many practitioners have further remarked, that the blood, which is at first brown, of an unnatural color, and more or less thick, becomes clearer and thinner after a certain quantity has flowed; thus the circulation is restored to its healthy standard; but, this is far from being always observed, though the disease may terminate favorably. It has also been observed, that in cases attended with an increased action, the blood is much less changed than where there has been prostration from the first.

Before leaving this subject, we would say a few words as to the morbid appearances described by Christie, Searle, Annesley, Mason Good, Burrell, White, Orton, and other distinguished physicians in the East India Company. 'It is in the mucous membrane of the stomach and bowels,' according to the author first named, 'that traces of the disease are invariably to be met with. There are always to be found many portions covered with a whitish, opaque, viscid substance, which adheres to the intestines and fills their cavity to a considerable extent. In the stomach and some parts of the intestines, there was an abundance of serum, sometimes clear, sometimes turbid; it was either intimately mixed with the viscid matter above described, or at other times this last appeared in it in flakes.' Another physician, Dr Schnurrer, has noticed the undefinable doughy feel of the intestines which we found in the greater number of the bodies we examined. 'The intestines,' he says, 'have lost their usual polish; they are very flaccid and yielding; the mucous membrane is wrinkled and doughy, and the sub-mucous tissue is congested.' Searle, in his excellent work on cholera, describes the internal organs as gorged with blood; large portions of the intestines as contracted so as not to admit the finger; the stomach and other parts of the digestive apparatus very frequently inflamed, especially when the disease has lasted for some days, whilst the traces of inflammation are much less evident if its progress has been rapid; the liver, the heart, and the lungs, have, also, in many cases, shown marks of inflammation. In the work of Mason Good we learn that, in the examinations made at Bengal, the stomach and intestines contained a great quantity of gelatinous substance; the surface of the organs was slightly congested; the liver was considerably enlarged, from the quantity of blood which filled its vessels; the gall bladder was filled with a black bile, which was either thick or liquid; the bladder was empty, and contracted behind the pubes; the kidneys seemed smaller than natural. At Bombay there was found more extravasation and congestion than at Bengal; all the organs within the thorax and abdomen had their small vessels ruptured, or were gorged with black blood; the stomach and the liver were principally affected. At Ceylon, the morbid appearances were somewhat peculiar; the brain was the organ most congested, whilst the liver appeared healthy. Dr Davy has, in some cases, found the muscles extremely flaccid, as in animals killed by electricity or by fatigue.

This hasty review of the morbid appearances, which have been described in many English works, sufficiently proves that if some epidemics produce the same effects, there are differences in others which are interesting to be observed; thus, in fact, are explained the variety of symptoms, and the inefficacy of remedies at one time, which at another were found useful. We shall again return to this important point, on which we have always insisted,

and especially in a letter to M. Esquirol, written at Warsaw on the 23d of last June, and published in the July number of the Annales d'Hygiene.

It was observed, at the beginning of this chapter, that from a study of the symptoms we were inclined to believe the nervous system to be primarily affected in this disease, and that, through the medium of the gauglions, it reacted on the mucous membranes, more especially on that of the intestines. In a great many cases, this action on the alimentary canal has produced more or less severe inflammation; we mean not to support a theory, but simply to state a fact. The history of the morbid appearances which we have just examined, adds still more weight to this opinion. If we return to the numerous post-mortem examinations which have been made, we shall find the most important and constant changes to be, first, in the brain, which is almost always gorged with blood; sometimes there is serum in the ventricles and at the base; the spinal marrow and its membranes were often injected, the sheath containing serum, blood, or a gelatinous exudation; the mucous membrane of the intestines was pale and whitish, but it was often injected, presenting patches more or less red, and sometimes having a gangrenous aspect; it was thin in some cases, being torn with great ease; the mucous follicles were enlarged; finally, the alimentary canal contained a substance varying in amount and consistence, and which was evidently owing to a change in the nature of the secretion of the mucous membrane. Such, then, are the changes which confirm our view of the subject, and at the same time prove that the principle which acts on the animal economy first attacks the nervous system, then the mucous membranes, and particularly affects the alimentary canal.

IV. Is the spasmodic cholera, as described by those who have witnessed it in Asia and Europe, a new disease?

In reply we may state, first, that we are not familiar in this country with any disease resembling this in the intensity of its symptoms, nor in the rapidity of its course; still less in its extensive prevalence. But in some rare instances even in New England, and probably oftener in some other parts of the United States, such a disease has been seen. Among European writers, we find this disease described by those of different ages. Not only the common cholera, marked by the discharge of bile, but that in which the fluids discharged are colorless, in which violent and excruciating spasms occur, in which the prostration is sudden and extreme, and in which life is briefly terminated after agony and torture, was evidently known to Aretæus and other ancient writers. Among the moderns it may be enough to state that it is briefly described by Van Swieten,

and that Sydenham clearly depicts it as an epidemic which he witnessed in London. In confirmation of these statements it would be easy to quote passages from various authors. The brief but very graphic description of Aretæus especially might seem worthy of repetition. But the quotations from these sources have already been repeated in so many works that we deem it unnecessary to present them in a new edition.

Now the signs just enumerated are those by which spasmodic cholera is to be known. But it is not true that we find accounts of this disease as a general or extensive epidemic in Europe at any former period. It would seem that in India, cholera has been epidemic and extensively mortal at various periods, and perhaps it has been so in all ages. But the accounts we have do not show that the epidemic has in any other instance been so decidedly marked as this spasmodic cholera, nor that it has extended so widely even in Asia as has this disease since 1817, nor that it has continued for so many years in succession to exhibit the same malignant characters. Still less does it appear that, in any other instance, the epidemic has been extended over the ancient continent, as this has been; passing from the south and east to the north and west, in continued lines.

This great distinction in the epidemic, which is the subject of this report, must be kept in mind in considering its causes; since it is obvious that those which would be sufficient to account for its occurrence between the Indus and the Ganges, would not explain its prevalence north of the Caspian Sea and on the shores of the Baltic.

We conclude then that the spasmodic cholera of India does not differ from the same disease, as heretofore known, in any essential feature. But viewed as an epidemic it is distinguished by its extensive prevalence, by the violence and intensity of its symptoms, by the rapidity of its course and by its fatality.

It may be proper to consider distinctly whether the disease in Europe is the same as that in Asia. In this point we subjoin a quotation from the report of Drs. Russell and Barry. These gentlemen had been sent by the British government to Russia to acquire information on the epidemic there. They were both, undoubtedly, fully competent to the office assigned them. Dr Russell was especially qualified to decide on the question now before us, having had much experience in Bengal, while the cholera was epidemic there. It may be well to add, though scarcely necessary, that Dr Russell was known to some of our own countrymen in Calcutta, as a practitioner of great respectability.

On their first arrival in St Petersburg those gentlemen were admitted to see the cases in the military hospitals. Under date of July 1, 1831, Dr Russell writes as follows.

'After a careful examination of all the symptoms of these cases, in different stages of the disease, I do not hesitate to state my unqualified conviction of its perfect identity with the Indian spasmodic cholera.'*

In a letter written on the same day Dr Barry expressed his assent to Dr Russell's opinion, and has the following passage.

'The appearance of these men fully confirmed Dr Russell in his opinion, as to the most unqualified identity of the two diseases. Indeed, though one of the two first cases was in the second stage of the disease, Dr Russell exclaimed, after the first glance at him, "This is the genuine disease." Dr Russell also pointed out, with a practical tact, which seemed to strike Sir James Wylie, some remarkable features of the disease in the four recent cases, not noticed by the medical gentlemen then present; viz. the coldness of the tongue, which, though clean, and apparently natural, felt to the touch like a morsel of dead flesh; the tone of the voice, the same in all, resembling the efforts to speak which persons make who have lost their voices; the sunken, dim eye.'†

On the 27th of July, Dr Russell, while he confirmed his first opinion, pointed out the shades of difference between the Asiatic and Russian epidemic.

'In my first communication to the Government, after stating my entire conviction of the perfect identity of the disease now prevailing here, with the true Indian cholera, I noticed that the vomiting of fluid and retching were not so incessant as with us in India; neither were the evacuations from the bowels so copious or so frequent. Further observation of the disease has confirmed the truth of what I then remarked; and even when the vomiting and purging exist at the commencement, they much sooner cease, or are more easily checked.

'But the disease appears in this country to be further modified, and to present *a new feature to me*, in the nature of the fever, which, in the second stage, succeeds to the first — the state of collapse — and which appears to be fully as dangerous, if not more so, than the cold stage. Persons attacked with the cholera in India were generally convalescent in a very short time, and restored to health in a most surprising manner, without passing through any intermediate state of fever; and when the reaction was followed by a feverish state, it generally partook of the char-

* Official Reports, p. 20. † Ibid, 21.

acter and type of the common bilious fever of the country, and was rarely, except in some circumstances and constitutions, attended by cerebral, abdominal, or other congestions, but yielded readily on the removal of acrid vitiated bilious accumulations in the bowels by means of purgatives, &c.

'Here, however, the cases of recovery from the first — the cold or collapsed stage of the cholera — are few; and so soon almost as the reaction takes place, they fall into a state of fever, partaking very much of the typhoid character, which is indicated by a dry brown foul tongue, suffusion of the countenance and eyes, stupor, low and languid pulse, &c; and *many*, I should even say *more*, from what we have observed, are carried off in this stage than in the first or primary attack of the disease; neither is this form of fever, so like typhus, at all modified by the treatment of the first stage of cholera; for notwithstanding the infinite and contradictory variety of medicines that have been employed to meet the first attack of the epidemic, the secondary fever assumes almost uniformly the same type, differing only in the degree of the duration and fatality. Nor does it possess apparently the specific character of contagious typhus; for we have not observed among the attendants of the hospitals, many of whom have been taken ill, a single case in which fever has been the primary disease; but on the contrary they have been all, even when secondary fever has constituted the most numerous class of patients in the hospital when attacked, seized with the symptoms of the primary stage of spasmodic cholera; and in comparison with the other classes of society, the proportion of medical men and attendants on the sick, who have been taken ill during the present epidemic here, is infinitely greater than in India, and forms another important feature of difference.'*

The Committee think it proper to add the following which has come under their notice since the preceding pages were written. It is a letter from Dr Barry at St Petersburg, July 30, 1831.

'Names for diseases or medicines, so contrived as to constitute little definitions, are bad things. I came here with an impression strongly fixed upon my mind, that the essential and dangerous features of cholera morbus were immoderate and ungovernable vomiting and purging of a serous fluid, violent spasms, and the exhaustion and collapse necessarily attendant on such a state; consequently, that the first indication would be, to restrain these depressing evacuations. The fact is, however, that vomiting and purging are amongst the least important symptoms of the present epidemic, though the appearance of the fluid evacuated is highly characteristic. Rice-water strained and allowed to settle

* Official Reports, p. 40, 41.

down is, when shaken up, the best type. The evacuations, both upwards and downwards, either soon cease, or are easily represed; while in many cases, and these the very worst, there are either none, or they are very trifling. It is the sudden paralysis and rapidly diminishing action of the heart, of the arteries, and of the organs of respiration, with the stasis and thickening of the blood, the loss of the power to generate heat, that constitute the real danger of the first — the most fatal stage of this disease. Blue, black, flat lines, mark the course of the larger veins; a deadly livor colors the skin; even the tongue is icy cold; the respiration is short, quick, and imperfect; the scrobiculus cordis and diaphragm drawn violently upwards and inwards: the pulse and voice extinct; the limbs and belly torn with spasms; the hands and feet shrivelled, corrugated, and much diminished in volume; the reason unimpaired. It would seem as if all the colorless cells and vessels upon which the turgor or plumpness of the integuments so much depends, were squeezed to emptiness, and nothing left but the thickened coloring matter of the blood. If this state cannot be overcome in a very few hours, the sufferer must die. *Mordechi*, or *mort de chien*, or *mort noir*, would, either of them, be a much more appropriate name for this inexplicable malady, than that by which it is at present designated. I am now quite convinced that neither Celsus nor Sydenham ever saw this disease, else they surely would not have omitted *all the symptoms* that I have just enumerated.'*

The opinion of these two English physicians is confirmed by various other authorities. The following, being the first unequivocal case of spasmodic cholera in London, and which occurred in February last, may be added as showing how exactly it exhibits the characters of the Asiatic disease.

'We subjoin the notes by Messrs Jackson and Gaitskell, on the symptoms of the case above alluded to, with the results of their pathological examination of the body of the deceased.

Case I. — *Case of John James, Æt.* 48, *Ship Scraper, working on board a collier from Newcastle; died on Thursday, Feb.* 9, *at* 4 *o'clock in the morning, fourteen hours after leaving off work. — Notes by Mr Jackson.*

On Wednesday, 8th February, I was desired to visit a sick man who was very ill, in Hanover-street. It was about 8 in the evening when I arrived: the following was the statement. That he had had a loose, or irritable state of the bowels for some days past, but more particularly from the preceding Monday. He, however, followed his usual occupation till the day of attack, about two o'clock in the afternoon, (on board of a ship in the Re-

* Official Reports, p. 107, 108.

gent or City Canal), when he was obliged to relinquish it from vomiting, and cramps in his hands and feet. On my visit, he was lying on his left side, with his head and chest slightly bent forward, and the knees a little drawn up.

The extremities, abdominal, lumbar, and pectoral muscles, were in a complete state of tonic spasm.

The features of the face sunk and pinched, exhibiting an indescribable countenance of anxiety, suffering, and despair. The surface of the face blue, and peculiarly so the lips, as in a patient laboring under hydro-thorax.

The tongue cold and moist, with a white appearance as if he had been licking pipe-clay.

The breath nearly cold.

Vomiting of a matter resembling turbid or muddy water, with thirst, and great pain at the pit of the stomach. Respiration greatly oppressed. The surface of the body cold, and the extremities most peculiarly so, giving the sensation of touching a dead body, covered with a clammy sweat. Of what kind or quantity the purging was, I did not ascertain.

Not wishing to designate the case before me what I really thought it was, I called in Mr Gaitskell, when we found the patient still worse in all the symptoms. The pulse gone; tongue cold, and also the breath ; the breathing slow, and oppressed, with a strong pain over the region of the heart, which prevented him from breathing. He was quite sensible throughout.

His voice a whisper, with a curious thrill.

We left him about 11, P. M., and he died about 4 next morning.

Dissection of John James, Ætat. 48, *about fifty hours after death.*

External Appearances. — The whole frame rigid, hard and inflexible ; fingers bent in and corrugated, of a light leaden color, nails blue ; the feet the same, but not in so obvious a proportion ; the penis and testes blue ; the countenance natural, but the eyes much sunk. (The lividness of the countenance is reported by his relatives to have kept gradually disappearing since death.)

Abdomen. — The stomach distended with fluid, but the intestines moderately so, the latter presenting a slight blush ; the jejunum, ileum, and colon, were opened for a considerable distance in different places, and each contained a fluid resembling thin gruel ; there was not the slightest appearance of bile or fæces, or odor of the latter observable ; the contents of the stomach were the same as those in the intestines, only rendered darker from the admixture of brandy, medicines, &c. The internal coats of the stomach and intestines were remarkably healthy.

The *bladder* was contracted and firm, containing no urine, but a small quantity of fluid, resembling that in the intestines. The pancreas and spleen healthy ; the right kidney small, but the left

one healthy and natural; the liver healthy, but when cut into, the veins were loaded with black blood; the gall bladder healthy, full of bile, and without gall-stones.

Thorax.— The lungs natural, healthy, but much collapsed; no water in the chest or pericardium; the heart healthy, natural, large, with a considerable portion of fat on its superior surface. The right and left auricles were distended with blood, and I may here remark, that all the veins terminating in these cavities (as the venæ cavæ, inferior and superior, and the pulmonary veins), were the same. On removing the heart, and opening the auricles, the blood presented a thick, dark, tarry consistence, without intermixture of serum. The blood which flowed from the divided vessels had the same appearance. The ventricles were free from blood, but each contained a fibrinous coagulum, about the size of a nutmeg.

The head. — On removing the calvarium, the brain presented nothing particular, only the venous circulation was turgescent with dark colored blood. The substance of the brain itself was beautifully firm and healthy, and the ventricles contained no fluid whatever, neither was there any effusion, or particular turgescence of the blood vessels on the base of the cerebellum and cranium.

Throughout the examination of the various organs, there was not the least trace of any disease, either organic or constitutional, that could at all affect life, or even produce temporary inconvenience.

John Jackson, *Surgeon.*
W. Gaitskell, Sen., *Surgeon.*

Rotherhithe, Feb. 12, 1832.

The great importance of this case induces us also to add the report of Dr Anderson, the Medical Inspector, who attended at Rotherhithe, from the Central Board of Health, in consequence of the communication from the parochial authorities.

Appearances on Dissection of the body of John James, etat. 48, *fiftyfour hours after death.*

Had been employed for several days, previous to his illness, as a ship's scraper, on board of a vessel from Newcastle, the Elizabeth.

External appearance. — General emaciation, surface of the body somewhat darker than usual; skin of the hands corrugated; fingers and nails of a leaden hue; great rigidity of the lower extremities; feet and toes of a blue color; eyes much sunk; penis and scrotum of a dark blue color; from the report of his family, the color of body is not *now* so dark as when he died.

Abdomen. — The situation of the viscera natural; intestines present a slight blush of red on their external surface. Omentum

small but healthy; internal surface of the stomach healthy, but had a feel of being softer than natural; internal coat of the intestines healthy; both the stomach and intestines contained a considerable quantity of a whitish turbid fluid; no appearance of bile; mesentery healthy, and much congested with black blood; liver healthy; veins much distended with dark blood; gall bladder distended with thick bile; ducts healthy; pancreas healthy; kidneys healthy, right rather small, but structure natural; bladder contracted to about the size of a small fig, containing about two tea-spoonfuls of a similar fluid to that found in the intestines.

Chest. — Lungs healthy, with the exception of some slight adhesions to the pleura costalis; both lungs are collapsed; no water in the pericardium; heart much enlarged; both auricles much distended, with a dark, tarry, thick, colored fluid blood, without any appearance of coagula; the large venous trunks leading to it similarly distended; ventricles containing a large whitish fibrinous mass; structure of the heart healthy, perhaps rather softer than usual; vena cava, superior and inferior, and indeed all the venous trunks much distended with blood of a similar description; arterial trunks empty.

Head. — Vessels of the brain, *venous*, much distended with dark, thick blood, otherwise remarkably healthy; spinal cord not examined.

John Anderson, M. D., *Surgeon, R. N.* '*

V. What are the remote causes of the spasmodic cholera?

The remote causes of diseases are of two kinds; first, the predisposing causes; second, the exciting causes.

First, *of the predisposing causes.* It is certain that of all the persons exposed to the efficient or exciting cause of this disease a small proportion only were affected by it. This proportion has varied at different times and places. In situations where this proportion could be ascertained in India, it was sometimes found to be ten in a hundred. It was no doubt greater in some situations, but more frequently much less. In Moscow and St Petersburg it was calculated to be less than three in a hundred. In Sunderland it has been much less than in those cities.

If now we attend to the description of persons affected, we learn something of the causes, which predisposed them to the disease. In respect to these persons there is a very general agreement among all the observers. Yet, even of the classes to be described a good proportion have escaped.

In India, the natives were affected much more than Europeans. Generally the natives are subject to many privations;

* Cholera Gazette, No. III. pp. 129 — 130.

they live on a poor diet ; and are negligent of all the means by which health is preserved or vigor promoted. They are often filthy and crowded together in very small huts. They are apt to expose themselves to the dews of the night, and they are obliged to endure the heat of the sun during their labors in the day. Among Europeans in India, those who were intemperate in the use of ardent spirits, and such as were habitually debauched, were most liable to the disease, and had it in its worst form. Those who were exposed to great fatigue, suffered in like manner. It was often noticed, that individuals were seized immediately after travelling, and in military corps after a hard day's march. Persons already suffering from chronic disorders were very liable to the disease. The observations made in Europe conform with and confirm those which were made in the East. Some distinguished men have been the victims of the disease in the north of Europe ; but the list is a very short one, although the deaths from the disease in that part of the world amount to many thousands. Comparatively few medical men have lost their lives by this disease, though they have been exposed to it more than any others, not of the laborious classes. When it is recollected to what fatigues they have often been exposed in attending the sick, this may excite surprise. The principal cause of exemption must have been in their temperate and regular habits of living. Something, perhaps, may have depended upon due moral courage, the more easily maintained in consequence of the necessity of constant occupation. For it is to be added that the depression of fear is among the circumstances, which have been observed to predispose men to this disease, as it does to epidemic diseases generally, whether contagious or not.

Briefly, it may be said that in all places where the disease has prevailed, the persons most liable to it have been found to be, first, drunkards ; second, the filthy and those whose habitations are crowded ; third, those exhausted by fatigue ; fourth, those who live on a poor diet, especially on crude vegetables, or crude fruit ; fifth, those who are depressed by anxiety or fear.

But why was the spasmodic cholera produced, as it was, in certain places and at certain times, among persons thus predisposed. This question leads us to consider the other remote cause, called the *exciting* or *occasional cause*. In truth we have to inquire for that cause which is essential for the production of this disease.

If we were to seek for a cause which would explain the first occurrence of this disease in Indostan only, the task would be

comparatively easy: although we pretend not to be able to answer all the inquiries which might suggest themselves, even in this case. Why it is that the abdominal viscera are peculiarly liable to disease in the warm seasons and in warm climates, it might not be easy to decide; nor would it be more easy to explain why the parts above the diaphragm are most frequently diseased in the cold seasons of the year, and in cold climates. We are so familiar with these circumstances as to be sure that they are in accordance with some settled course of nature; and we are therefore apt to suppose that we know why they are so. But it is not in truth well ascertained whether the influence of the warm season is upon the abdominal organs, rendering them peculiarly susceptible of disease; and so, of the cold weather upon the lungs, fauces and nares;—or on the contrary, whether there are generated in summer peculiar substances in the earth and air about us, which are capable of acting on the organs of the abdomen, while in winter there are generated substances capable of acting on the lungs and vocal organs. Much might be said on both these modes of influence from the seasons. Perhaps both of them occur to a certain extent. They are brought into view now, not with a design to discuss them, but only to indicate the limits of our knowledge on some points, with which we might be supposed to be familiar.

It may elucidate this subject if we bring to recollection some exceptions to the ordinary course of diseases; the exceptions themselves being more or less constant in their occurrence. In the early part of summer, when roses and many other plants are in flower, catarrh and asthma, sometimes conjoined with a slight erythema over the face, are produced in various persons, and in some individuals regularly every year. The same happens to some persons when exposed to new hay. That the remote cause in these instances is derived from the plants is very certain, and here the organs affected are those least frequently diseased in the warm weather. So far it would frequently appear that the season produces the external cause, and does not operate by making certain organs susceptible of disease. Yet some predisposition is necessary in the cases cited, for certain persons are frequently or annually so affected, while the majority are never acted upon by the causes here described. Just so, independent of season, ipecacuanha received into the nose or into the stomach, will produce asthma in some individuals. Again, about the last of August or first of September, some persons are affected annually with similar

affections, viz. cough and asthma, one or both. The remote cause in this instance has never been distinctly pointed out. But that it is derived from some peculiar vegetable principle, is at least highly probable. It is equally at variance with the ordinary routine of diseases to have pulmonic affections at this time as in June. It is possible that the material in August is derived from the decomposition of some animal or vegetable matter. Some material of this kind is chiefly held in suspicion as causing the most frequent diseases of autumn, such as dysentery and fever. These facts may render it probable, that all the organs are equally liable to disease in summer and autumn; but that the causes developed at those seasons operate chiefly on the alimentary canal. Generally, cholera would be attributed to causes evolved or produced by the season, and not to a susceptibility merely; sporadic cases at any other than the warm season may be referred to acrid substances introduced into the stomach, or to great errors of diet. In the region of country in which the spasmodic cholera originated in 1817, a cause of the first kind might be supposed to exist. The mere occurrence of spasmodic cholera in Bengal that year would not lead to the supposition of any new agent there; for we presume there never is a year in which it does not appear in that country. The peculiarity in 1817 was that the disease was unusually mortal, and affected an unusually large proportion of the inhabitants. This alone would imply no more than that the remote cause was developed in great abundance, and thus could not be diluted by the atmosphere so much as usual; or that the material was peculiarly strong and concentrated.

When, subsequently to 1817, the disease extended through the surrounding countries, when it affected different places in a certain regular succession, the suspicion began to arise that the disease was produced in a new manner. Then first came the question whether it was not communicated from the sick; whether they did not generate in themselves the miasm or virus, which could produce the disease in others. Some circumstances favored the affirmative and some the negative answer to this question. These were considered by those medical men, who witnessed this severe epidemic during its prevalence in India. They were certainly best qualified to decide upon the question at that time. It is therefore important to ascertain what was the opinion adopted among them. As usual in such cases we find that they were divided in opinion. It would seem that they were so without having, or certainly before having arranged themselves as partisans on a disputed

question. They may be said to have differed in the honest exercise of their judgment. But we learn that in India a decided majority of the medical men were fully convinced, that the disease was not communicated in any way from man to man.

To this opinion it is probable that medical men in other parts of the world would generally have adhered, if the disease had never extended beyond the hot climates in which it originated. But, however great the preponderance was in favor of this opinion, while the disease was thus limited, yet even then there were, as has been shown, some reasons for adopting the opposite doctrine.

The subsequent extension of the disease to countries in which it may be said not to be indigenous, its extension to cold countries and its prevalence in cold seasons, call for a review of the doctrines on the subject. We must seek for a cause which is consistent with these facts. Learned and ingenious physicians, in the various places in which the disease has appeared, have sought for causes in the circumstances of their own situations. The sensible qualities of the seasons have been looked to as among the causes at least. In Bengal, in 1817, the rains had been abundant; in Petersburg, there had been deficiency of rain before the invasion of the cholera. In some regions the disease arose when the heat was oppressive, in others it began and continued during winter. At some places the low and malarious grounds have been accused. But it has likewise appeared in the highlands, both in Asia and in Europe, and in situations regarded as peculiarly salubrious. Of this kind is the country around Orenburg. Those who have visited the peculiar haunts of the disease in large cities, have found in the filthy and crowded habitations of the poor, where it has been uniformly most prevalent, abundant causes for any pestilential disease. If the cholera were always found there, the causes would not be the subjects of dispute. It is agreed that among the miseries of such poverty, a disposition to disease generally is one, and not the least. But none of these explanations will be admitted as satisfactory, as the facts are now understood.

It is said, with much more reason than is offered for any of these explanations, that we should not expect to discover the cause of this disease; that the histories of epidemics show us that they arise without reference to the sensible qualities of the air, prevail for a season, and then disappear; while we can see as little reason for their ending, as for their beginning. That this is true, any man may learn in a life of ordinary length, by his own observation, as well as from the records of past times.

If it were true of every disease, which in the original sense of the term may be called epidemic, we might leave the discussion here. For we should hardly attempt to solve a problem, which has foiled the most wise and most learned in all past time, although we may entertain a hope that this problem is not always to remain without a solution. But it is not true that the *cause of the extension* of epidemic diseases has always escaped discovery, even though their origin may have done so. The small pox, and the measles, to mention no others, have frequently been epidemic. In all these cases, some predisposing causes must have favored their extension, since they often exist as sporadic diseases only. But the efficient cause of this extension has certainly been contagion. In other words, the disease has been produced by emanations from those already affected. How or where those diseases first originated is unknown. We have every reason to believe that they did not exist in the early ages of the world. We have reason to suppose that the oldest of them did not appear much, if any, more than thirteen hundred years ago. We can hardly suppose that they have been generated *de novo* at various periods since. Most probably, since their origin, they have been maintained only by contagion. The experience of New England alone, where the small pox has been jealously watched for a long series of years, would satisfy us on that point, as to this disease. But when the eruptive diseases here named first appeared, they were not discovered to be contagious. So far from it, even a century and a half ago, Sydenham seems not to have understood that small pox was so.

An epidemic disease then may be propagated by contagion, especially under circumstances favoring its diffusion; that is, under unknown predisposing causes analogous to those which favor the extension of small pox, &c. Hence, upon the occurrence of a new epidemic, it is a legitimate inquiry, whether it is contagious.

But in entering on this inquiry we must be warned by the history of medical opinions in regard to other epidemics. Briefly we may say, that most mortal epidemics have been attributed by a portion, and often by a large portion of those who have witnessed them, to contagion; and very rarely has this opinion been confirmed by subsequent experience. In our own times, the disease called yellow fever has been thought to be propagated by contagion by some physicians, formerly by many physicians in our own country; and till lately, by almost all the physicians of Europe. Now there are not probably twenty

physicians in the United States and the West Indies, who have known this disease and adhere to this opinion. And in Europe, those who have studied the subject impartially, have also renounced it, or many of them at least.

Thus warned, let us examine impartially the question before us; remembering on the one hand that the welfare of our country may possibly be involved in the decision to which the medical men of the country may be brought; on the other hand, guarding against the desire, so natural to man, to fix on some definite cause for the phenomena presented to us. It is better to avow our ignorance, than to admit an explanation not well supported by evidence.

In pursuing this inquiry we shall state first the considerations in favor of the doctrine that the *present epidemic spasmodic cholera* is contagious; and afterwards those in opposition to this doctrine. In doing this we shall necessarily examine the history of the epidemic, and notice what evidence this furnishes in favor of the one side or of the other.

In support of the doctrine that the epidemic spasmodic cholera is contagious, or propagated from those affected with the disease to those who are susceptible of it, the following statements are offered.

1. The disease has been frequently noticed to occur in persons who have recently been exposed to those affected with it, and it has sometimes been traced through several diseased subjects in succession.

Before referring to the facts under this head, it should be stated, that if such facts could not be adduced, this would operate greatly against the doctrine of contagion. But, unless such facts are very numerous, they do not operate strongly in favor of the doctrine. Mere coincidence would account for many such facts, without supposing contagion to operate. These observations, however, apply with least force to those instances, in which the disease is traced through several subjects in succession.

'Dr Daun and Mr assistant surgeon Gray, of his majesty's 89th regiment, were both seized with the disease after intimate intercourse with the sick; and two friends, who attended the latter during his severe illness, were also seized, while no other European officer of the corps suffered.'*

'Dr Burrell, in his report, dated Seroor, July 27th, 1818, says that "almost every attendant in the hospital, in the short space

* Hawkins on Cholera, p. 135, quoted from Sir H.'s Madras Report.

of six days, has had the disease." There were about thirty attendants in the hospital.'*

In the documents which the Committee have had an opportunity to examine respecting the disease in India, they have found various statements of the same kind; that is, in which the attendants on the sick have been affected in a greater proportion than other persons. But in the great majority of instances it was otherwise, so as to be the subject of distinct remark.

In Moscow and Petersburg it would seem that the attendants on the sick were affected oftener than other persons. According to Jaehnichen, this was the case in Moscow. In St Petersburg, the proportion of persons attacked was little more than two in a hundred. This, however, refers to the whole population. Among adults it might perhaps amount to five in a hundred. Of two hundred and sixtyfour physicians in attendance on the sick, above forty were attacked, and nineteen died.†

We have not any similar statements in regard to medical men in other parts of Europe, except at Orenburg, where the medical attendants were not at all affected.

In respect to medical men, it is to be noticed, that the fatigue and anxiety to which they are subject, predispose them to the disease. On the other hand, their cases, as well as many others, are not always reported. The cholera very often commences with a diarrhœa, as has been noticed. If this be duly treated, the disease is arrested in most cases. Medical men often, though not always, adopt the proper treatment, and then they are not placed on the list of cholera patients.

The following is quoted from the *Periscope* in Johnson's Medico-Chirurgical Review for 1826, (New Series, Vol. V. page 259.)

'About the middle of May, 1825, a convict was sent from a village, where cholera had appeared, to Chanda, eighty miles to the westward. Two hours after his arrival at this place, he was attacked with the epidemic, and in two hours more Mr Montgomery saw him. His symptoms were — vomiting and purging of a watery fluid; severe spasms of the abdominal and gastrocnemii muscles; thirst; coldness of the extremities; clammy perspirations; anxious countenance; jactitation; great prostration of strength. Laudanum, oil of mint, brandy, the usual treatment

* Hawkins, p. 137.
† Official Reports of Russell and Barry, p. 91.

in that part of India, were employed, but in twelve hours from the first attack, he was dead. He was carried out for burial by four other convicts: three of them were attacked on that and the next day with similar symptoms, and two died in eighteen hours. A native who gave them their medicines, was seized with the cholera on his return from the jail, and nearly perished. The disease now spread among the convicts, (those only who had been in communication with the persons who labored under it suffered) and six died in as many days.

'Further: four police-men escorting treasure from a distant village to Chanda passed a night at Mhool, where the disease was then raging—the next day two of them were taken ill on the road and died in six hours. The other two, a few hours after their arrival in Chanda, were seized with cholera and died likewise within six hours.'

To this the reviewer adds the following remark, to which we assent.

'If the above relation be perfectly correct, it certainly affords strong presumptive evidence in favor of the contagious nature of cholera morbus. But when we consider how many errors human judgment is liable to, and how often coincidences are set down for consequences, we may say the paper does not carry perfect conviction to our minds.'

The statements here subjoined are extracts from Kennedy's 'History of the Contagious Cholera' published in 1831. They were collected by him from the reports of medical officers in India, published by order of the government.

First.* 'The cholera first appeared amongst the inhabitants of this place immediately after the departure of the first battalion of the 16th regiment, amongst whom it had been raging during their march from Hyderabad, and during their three days' continuance at this station.'— p. 108.

Second. 'There is one fact certain, that his Majesty's 34th regiment carried it with them from Bellary to Nundydroog, and that there was no trace of the disease in the villages on the road. Since the regiment passed, every village on this road has been invaded.'†—p. 120.

'Third.‡ 'A detachment of Europeans from Madras, under the command of Major Wahab, arrived here with the cholera

* W. Train, Surgeon, Ghooty, February, 1820.

† J. Duncan, Surgeon, Bellary, Oct. 13, 1818.

‡ A. Connell, Staff-surgeon. Secunderabad, May 20th, 1819.

amongst them. The disease first attacked these troops at the Kistnah, after exposure to a heavy storm of wind and rain, and it continued with them from thence to this place, although all the villages in their route were entirely free from the disorder. During the march, sixty individuals perished, of whom eight were Europeans. On its arrival here, the detachment encamped about two hundred yards in front of our artillery lines. In this new situation, three Europeans and a number of natives died. At this time no case of cholera had occurred in the encampment. The Europeans, however, of Major Wahab's detachment mingled with our party of artillery; and, in the course of four or five days, the disease began among the latter. Several were severely affected, but they all recovered through the prompt medical assistance afforded. The next seized was the wife of a conducter, in the artillery lines. She was attended, for a couple of hours, by her friend Mrs Gray. Mrs Gray was seized soon afterwards, and died the ensuing morning. The son of the latter, a boy about six years of age, was infected the day after his mother died, and recovered. My sub-assistant, Mr Hoskins, who was constantly with the sick, contracted the disease and died in twentyfour hours. Another acting sub-assistant, Mr Sleven, who attended particularly to Mrs Houghton, a patient that had suffered severely, was attacked; and, Mr McDougall, an assistant-surgeon, who was much among the sick, was also seized. From the artillery lines, the disease travelled to the bazaars, and many of the natives were carried off. The men of his Majesty's 30th regiment, who were in barracks about half a mile to the right of the line, completely escaped, not a man having been affected or any of the followers.

'I beg to add that Mr Jones, surgeon of the 6th light cavalry, has just arrived from the Kistnah, by the same route as Major Wahab's detachment pursued. Mr Jones states that he found the cholera prevailing in every village, having commenced soon after the passage of Major Wahab's detachment. The inhabitants said they had got it from that detachment.—p. 128–130.

Fourth.* 'Before speaking of the cause of cholera, I beg leave to advance the following facts on which my opinion is founded:—

'1. Several showers of rain fell about the middle of June, which considerably reduced the temperature of the air. The weather since has been cool and pleasant. The thermometer seldom varying four degrees in twentyfour hours. The wind blowing steadily from the southwest. The sky has been generally cloudy, and the heat of the sun has never been great.

'2. The cholera prevailed in Nagpore, during the month of

* J. Kellie, Surgeon, Jaulnah, July 7th, 1818.

May. Upon hearing of the march of Captain Doveton with a detachment in which the disease existed, it was generally apprehended that the men would bring it here. The detachment arrived here towards the end of June, and the cholera commenced among us, the 3d of July,

'3. The Russel Brigade arrived here on the 4th, and left this the 5th, without a symptom of the disease. In a few days after, it broke out among them, and was attended with great mortality. Messrs Palmers' party arrived the 4th, and marched on the 6th, without sickness; before they had reached Aurungabad many of the party were attacked. The disease began in Aurungabad, soon after their arrival.

'4. The first case I heard of at Jaulnah, was in the death of a woman of the Sepoys, encamped in Cawderabad. The first case I saw was the son of the preceding, a boy of four years old, who had been constantly with his mother during her illness. Shortly after her death he had been seized with similar symptoms, and in a few hours he was also carried off. From this period the disease spread rapidly as from a focus among the inhabitants of Cawderabad, and on the day following it extended to the troops and to the bazaars.

'5. Cawderabad is situated towards the rear, and to the right of the lines. The disease raged most severely about the right, centre, and the bazaars, the streets of which extend to the gates of Cawderabad.

'6. The Royals were immediately in front of the general bazaars, with which they held constant communication. They suffered much from the malady.

'7. The men of the Horse Artillery were a considerable way in front. They had less direct communication with the general bazaar, and little intercourse with the Royals. They suffered comparatively very little.

'8. A woman having been taken ill, was assiduously attended by her daughter, who became soon after infected herself. Two children, whose mother had died of the disease, were discovered in the bazaar, lying under a blanket. The elder, about three years old, had received some medicine, and was slowly recovering. The younger, a baby of ten or twelve months, who had been clinging to the breast of his dying parent a few hours before, was now in the last pang. Instances of this sort were numerous.

9. Of the European patients in Field Hospital for other complaints, three were seized with cholera after patients had been admitted with the same disease. Of these new cases, two, one on each side of the ward, were at the part nearest to that which had been appropriated to the reception of cholera patients.

'10. Orderly Sepoys, attending on the sick, were so generally attacked, that their attendance came to be enforced with difficulty.

'11. When it appeared in a family, it usually happened that several of its members were seized.

'To these facts I have been an eye witness.' — p .131–135.

Fifth.* 'The disease has travelled in the very face of the wind from village to village, from one military station to another, and *in the exact route of troops.* From Nagpore to Jaulnah, from Jaulnah to Aurungabad and Mulligaum, from Aurungabad to Seroor, and from that to Bombay. It has progressively visited the different villages between this and Hyderabad. At Hyderabad two officers have lately fallen a sacrifice to the malady. One of these had constantly attended the death-bed of the other, and he himself was a corpse fortyeight hours after.' — p. 134.

Sixth.† 'A second dresser and a servant of mine, who were much employed about the sick, took the disease and died. I experienced two mild attacks myself, and two other medical servants attached to the battalion were seized.'—p. 139.

Seventh.‡ 'During a march performed some months ago, at a time when cholera was not prevalent in that part of the country, an orderly havildar was suddenly attacked. Being solicitous for his recovery, I remained in the hospital several hours watching the progress of the symptoms. At the moment of quitting the tent I felt a little nausea, and attributed it to the particular fetor of the interior. The following morning I was attacked with cholera, which proved nearly fatal. At this period no other case occurred. In the same detachment, a short time previous, it happened that a woman, who was very anxious for the safety of her child, slept in the hospital tent in which were several cholera cases. In the morning she was seized with cholera and died. Besides this woman one of the three orderlies attendant on the sick, and who slept within the hospital, was seized. Thus it will be seen that of four individuals who chanced to sleep in a hospital containing the infection of cholera, two, or one half of all so exposed, are attacked on the following morning. On the other hand, in the whole camp, consisting probably of 1,500 or 1,600 persons, not five cases had occurred.'—pp. 150, 151.

Early in the last summer, Drs. Russell and Barry visited Russia, by order of the British Government, as has been before mentioned. One great object of their visit was to ascertain whether the cholera was contagious. They appear to have entered upon this inquiry with fairness and impartiality. Dr

* Second Report, dated Oct. 17, 1818.

† R. H. England, Surgeon, 1821.

‡ E. Chapman, Surgeon, 1821.

Russell had previously passed several years in Bengal and been familiar with the disease. From his experience there he was led to disbelieve in the contagious character of the cholera. From the evidence, they obtained in St Petersburg and its vicinity, he and his fellow-laborer were, both of them, satisfied that the disease was contagious. From their 'Official Reports' made to their Government, we have selected several extracts.

First. '*City Prison.* — From the moment that the disease was proclaimed, the strictest precautions were adopted; no person was admitted without medical examination; rooms were set apart for a cholera hospital, and persons of both sexes appointed to attend the cholera cases, should any occur. Dr Bish, who resides within the walls of the jail, and who, it must be observed, *was* an anti-contagionist, as acknowledged by himself, showed us a plan of the prison, illustrating the introduction of the disease amongst the prisoners, led us round the whole building,* and communicated to us the following information from his journal, which had been most accurately kept. "A woman had been sent out some weeks before to be treated for a syphilitic complaint,† in a public hospital. Her husband was also in confinement at the time, in a different part of the building, but remained. The woman was returned to jail, on the 23d June, O. S., with a diarrhœa upon her. She saw and embraced her husband for a moment, as she passed on to be placed in the room of observation. In a few hours she was seized with true cholera, and died that night. This was the very first case. The next persons attacked in the prison were three women in the same room with the former, one of whom had rubbed the deceased. These three died all within three days after the first. The next prisoner attacked was the husband of No. 1; he lived in a separate part of the jail. After this man, others in his room, all numbered on the plan, and registered in Dr Bish's journal. In short, of twentyseven attacked (fifteen dead), there is but one to whom communication cannot be traced. He was confined for a capital offence, and had less liberty than the others. There were about four hundred prisoners and attendants: the former are well kept and treated with great indulgence. None of the noble class, who are lodged in a separate part of the building, were attacked.' —p. 44.

* July 30.

† It is a rule, that this disease shall not be treated in the prison hospital.

Register of Cholera Patients in the Hospital of the City Prison. By Dr Busch, one of the Physicians of the Prison.

No.	Age.	When received in the Prison.	When seized with Cholera.	How soon dead after the first attack by the Cholera.	REMARKS.
1		15 *June*	23 June	after 6 hours	No. 4 had rubbed the cholera patients.
2		3 June	24 —	" 10 hours	
3		16 June	24 —	" 15 hours	No. 5 was the husband of
4		4 May	25 —	" 43 hours	No. 1; had seen his wife
5		24 March	25 —	" 5 days	on 22d, in the evening.
6	60	14 May	25 —	recovered	No. 10 was imprisoned in
7		17 *June*	25 —	after 14 hours	the same room with No. 7.
8		13 June	26 —	" 12 hours	No. 12 was the first who fell
9	17	13 April	26 —	recovered	sick of cholera in the com-
10		27 May	26 —	recovered	mon hospital of the prison.
11		20 *June*	27 —	recovered	No. 14 had rubbed the cho-
12		15 *June*	27 —	after 14 days	lera patients.
13	74	11 June	27 —	" 46 hours	No. 15, the *first* out of the
14		15 June	28 —	" 12 hours	division of the *invalids*.
15		27 *June*	29 —	recovered	The two other *invalids*
16		29 May	29 —	recovered	attacked by the cholera
17	70	18 *June*	30 —	after 12 hours	were not treated in the
18		16 April	30 —	" 9 hours	prison.
19		14 April	1 July	recovered	No. 21, the first of the pri-
20		27 *June*	1 —	recovered	soners for violation of pro-
21		23 May	2 —	recovered	perty.
22		9 June	2 —	recovered	No. 26 had rubbed the cho-
23	73	30 *June*	4 —	after 3 days	lera patients.
24		30 *June*	6 —	recovered	No. 29 had rubbed the cho-
25		19 *June*	7 —	after 4 days	lera patients in the divis-
26		8 January	13 —	recovered	ion for men until the 28th
27		18 January	14 —	after 2 days	June, when, frightened
28		11 *July*	19 —	recovered	with the death of No. 14,
29		9 *June*	28 —	recovered	he left off this occupation.

Abstract of the Individuals who lived within the walls of the Prison, during the period of Cholera.

(A) *Officers* employed in the prison, with their families.

(1) Higher officers, &c.	50
(2) Lower officers, &c.	50
Total	100

(B) *Prisoners.* — (1) Debtors 25
(2) Prisoners of the higher classes 20
(3) For police offences 120
(4) Under age 12
(5) For violation of property 80
(6) For capital crimes 12
(7) Women 45
(8) In the common hospital of the prison . 40

Total 354

Besides these there was a guard of one officer and ninety soldiers, who were changed daily.

'During the epidemic, which lasted from the 23d June to the end of July, O. S. fumigations were used, and there were rooms of observation in the prison. Though these have been abolished now six weeks, not a single individual has been attacked with cholera. All the higher officers of the prison, as well as the divisions (1) of the higher classes, and (2) of the prisoners under age, remained exempt from the cholera. In the division for female prisoners, which is kept in a state of great cleanliness, there was the uncommonly high number of eleven cholera patients. The division of prisoners for police offences, who lived closely and rather uncleanly, had comparatively very few patients. — pp. 142, 143.

(Signed) Dr Busch.'

Second. 'The first case in this village [Colpina] was on the 27th June, O. S.; one of a party of marine soldiers or regimented sailors, seventysix in number, who set out from St Petersburg for Colpina on the 21st, and arrived at the latter place on the 23rd. They had been all examined before they marched, and brought a certificate of good health. On the day of their arrival they were also examined by Dr Bowmann, the physician of the works, from whom we have this information in presence of General Wilson, and found in good health. On the 27th, the first man was attacked as already stated; No. 2 on the morning of the 28th, an invalid, resident at Colpina, who had been the pot companion of No. 1 since his arrival; No. 3 on the 28th also, an old woman who attended or nursed the second case.'—p. 47.

The third of these extracts, though long, contains so much that is interesting, that the Committee have thought its insertion ought not to be omitted. The facts stated in it are all of them in favor of the doctrine of contagion.

Third. '*Aug.* 15.—Foundling Hospital — accompanied to this institution by General Soblacoff, who speaks English perfectly, and kindly introduced us to the chief physician, Dr Duppé, residing in the house, with whom we conversed in French. This magnificent building is in the middle of the town, not far from the Nevesky Prospect-street. It contains about 3,000 souls, of whom nearly 400 are sucking infants. Amongst the whole there have occurred, during the present epidemic, 146 cases of decided cholera; 74 deaths. There were, besides, 80 incipient mild cases, of whom none died. The first case occurred on the 19th June (O. S.); a girl, 17 years of age, *a garde malade*, in one of two convalescent wards adjoining to, and communicating with each other, in which there were several convalescents from ordinary complaints at the time. She concealed her illness from the morning up to twelve o'clock, when she had an emetic. Dr Duppé saw her about half an hour after. She was then blue, cold, and without pulse; a genuine case of cholera. No communication has been traced between her and any cholera-sick. She could not have gone out of the house, being a foundling; but being a garde malade, she had the privilege of going to the kitchen by a back staircase. She could also see friends from the outside, such as foundling girls who had been married out to

soldiers, and others who sometimes bring their male friends to select a wife. The sick girl was placed in a room apart, with two nurses, neither of whom caught the disease; but two of four girls, gardes malades, who rubbed her before she was separated, were attacked the second day after. The girl herself recovered. On the 20th there were no fresh cases, but on the 21st there were several taken ill, all belonging to the room where the first was attacked, except two, who belonged to the second convalescent room already mentioned. A free woman, who lived in the yard below, was also attacked and died the same day.'—p. 48.

Divisions of the Imperial Foundling Hospital of St Petersburg, with the numbers attacked by Spasmodic Cholera in each, from 19th June, 1831. By Dr Doeppe, Chief Physician.

	No. of Inhabitants on the 19th June.	Of that No. were ill		Died.
		With 1st degree.	With 2d degree.	
A. Hospital for Female Foundlings contains — Convalescents	7	—	6	5
A. Hospital for Female Foundlings contains — Attendants	7	—	3	2
A. a. — People living in the same building, and having frequent intercourse with the hospital	26	3	6	2
B.—Division of the youngest infants — Wet-nurses	208	5	13	8
B.—Division of the youngest infants — Infants	158	—	—	—
B.—Division of the youngest infants — Other people	30	1	4	4
C. — Infants' Hospital — Wet-nurses	108	4	8	4
C. — Infants' Hospital — Infants	105	—	—	—
C. — Infants' Hospital — Other people	24	2	10	4
D. — Division of Male Pupils, Foundlings — Pupils	272	24	14	4
D. — Division of Male Pupils, Foundlings — Servants	18	4	7	4
E. — Division of female Pupils, Foundlings — Pupils	219	11	14	3
E. — Division of female Pupils, Foundlings — Servants	14	1	5	2
F. — Lodgings of free working people	29	5	3	3
H. — Division of elder Infants — Infants	159	—	—	—
H. — Division of elder Infants — Wet-nurses	159	3	5	1
H. — Division of elder Infants — Servants	20	—	2	1
I. — Cholera Hospital — Attendants of both sexes	42	—	7	1
I. — Cholera Hospital — Feldtshers	3	—	2	—
M. — Wash-house — Washer-women	43	—	5	3
M. — Wash-house — Male servants	10	—	1	1
N. — Apothecaries' Department	36	—	—	—
O. — Lodgings of stone-masons and house-carpenters	120	—	—	—
Z. — In separate lodgings, in different parts of the building	708	20	25	14
X. — Taken into the Cholera Hospital, people taken ill out of the house	0	1	7	3
Totals	2525	84	147	69
Besides the above, received at different times dying persons	—	—	—	5

'(*Translation.*)—The Result of Observations and Experience in the Foundling Hospital, at St Petersburg, with a view to the Aetiology of the Cholera.

'The contagiousness, or contagious nature of the cholera, is indicated by the following experience:—

1. The illness did not make its appearance in several sections of the house at once, nor did it attack several individuals simultaneously; but on the 19th one person in A., on the 21st one in B., on the 22d in C., No. 16, and finally, but only on the 24th, and that singly, in several sections.

2. In some of the sections it was late in showing itself; *e. g.* in the fully inhabited one, H. not till the 26th, and only on one person; others have had no sick at all, as N. and O.

3. In each division, at least two days of interval elapsed from its first appearance, before more persons were seized.

4. In no part of the house did it make its appearance by attacking persons who had been confined to their sections. The persons attacked were always those who went freely about in the house and city, and consequently might receive the infection from out of doors. It was not one of the seven female convalescents in A., (who, it might fairly be presumed, were more susceptible of it, as proved to be the case at a later period,) but the strong, healthy female nurse of No. 1, seventeen years of age, who was first seized. In B. No. 9, one who, two days previous, had been let out of the house. In C. not one of the hundred and eight nurses of this section, but the female attendant No. 16. In D. none of the two hundred and seventytwo foundlings, but the male attendant No. 30. In E., No. 24 sickened the first, who had been let out of A. on the 20th, to all appearance in health, and she is therefore classed under A. This is the more striking, or remarkable, it having been generally observed, and several instances can be brought forward here to confirm it, that persons who take much exercise in the open air are less frequently attacked. More opportunities to commit indiscretions in regard to diet may, by possibility, be attributed only to No. 16 in D.; but not to A. B. C. and E., because those first attacked in these sections had precisely the same food as the others. Indeed, there could no proof be established, of any one having committed any great dietetic indiscretion. It is true that, No. 24 excepted, none of these individuals were aware of having had any previous communication with persons sick of the cholera, but the possibility still existed.

5. The illness raged with the greatest violence in the sections from which the sick were not promptly removed; *e. g.* in A., where No. 1, the first person (a female) in the whole house who fell sick, remained three hours; in F., almost entirely inhabited by free men (handicraft), who did not allow themselves to be removed, until they could no longer conceal the complete develop-

ment of the disease. In F., the family of the coppersmith, Ahl, consisting of five persons, three of whom had the disease very severely; they had, by entreaties, succeeded in obtaining leave for the father not to be sent to the hospital, which was the more readily granted, as the family live quite separate, and only the father had any communication with the other workmen. A fourth of the family, a young girl of seventeen, became ill, but so slightly that she has not been recorded.

I think it proper to remark here, that the female convalescents in A. had suffered from the following complaints: — Nos. 5 and 6, febris catarrhalis; No. 7, tumor lymphat. genu; No. 4, febrés rheumatica; Nos. 10 and 24, peripneumonia; all, No. 7 excepted, were on the point of being let out of the hospital.

6. Not one of the one hundred and twenty people employed during the whole course of the epidemic, in building the new hospital for the house, was taken ill. I need not mention that they used no precautionary measures, but lived quite in their usual way, generally sleeping at night in the open air, on the bare ground, or in their very confined wooden huts. I must, however, not omit to add, that they were completely isolated from the rest of the house, and, as usual with these people, lived amongst themselves, having very little intercourse with the city. Further, that the spot where they had to work was contiguous to the cholera hospital yard, and only separated from the same by a boarded fence.

I take the liberty of adducing a similar instance, though it does not belong to this place, because I have it from an authentic source. Of about six hundred masons who were employed at the Isaac's Church, and whose great dread of the illness caused them to live, though in the midst of the city, almost entirely isolated, only two sickened, who were immediately sent to the next hospital. They attributed their good fortune to having a well to themselves, out of which they drank clear, unpoisoned water.

7. In opposition to the preceding case, most persons who came in frequent contact with cholera patients sickened of the disease. In the cholera hospital two of three feldschers were severely attacked; of the other fortytwo attendants, it is true that only seven were reported as sick, they only having reached the second stage of the illness. More than half of the number were slightly attacked, and on that account were not reported. The family of the staff-surgeon, Counsellor Kubarkin, was among the number of those living secluded in the hospital yard, and of them one was severely, four were slightly attacked. I myself had a slight attack; such was likewise the case with the police-master of the establishment, the priest, the wife of the clerk, two writers, and several invalids, who carried the sick from the sections A. B. C. D. and H. in sedan chairs: all these were severely ill.

8. The disease raged in the fourth story (C.) in the same de-

gree, and according to the same laws, as in the first, second, and third. The position of the windows made no manner of difference, whether to the north, west, south, or east. Those of A., where, of seven individuals, six were seized and five died, were all to the southwest, and open to a fine, large open spot, planted with shrubs and flowers; the rooms, two in number, are on the second story, very spacious and lofty; great attention is paid to cleanliness and pure air, the same as in all public establishments of St Petersburg, but most especially in those of the late Empress Maria, with an anxiety bordering on pedantry.

9. The epidemic, considered with regard to its intensity, does not progress through its *stadia incrementi*, *acme* and *decline*, but those first seized, who are consequently the most predisposed for, and offer the least resistance to it, are those who the most easily and quickly become its victims. Everywhere, as with us, those who first fell ill were the most dangerous cases. The later were mostly slighter cases, having occurred to persons who no doubt had previously come into contact with other sick; but, having themselves less predisposition, they the longer withstood the illness, and when finally it reached them, the attack was slighter. There intervened, however, at all times many very severe cases. On the 7th and 8th Sept., there again sickened suddenly two individuals in the house, one a hearty man of about forty years of age, who died in sixteen hours after the first symptoms appeared, and this occurred when we had had no severe case later than the 7th July. Admitting the contagiousness of the cholera, the occurrence will admit of explanation, by adding that the doors of the house had been closed, and were again opened on the 1st September, and the interdicted thoroughfare, which shortened several roads, was again opened to every body. One of the two new patients was one of the porters at a gate that had previously been closed; and the other was a sergeant's wife, living close to another of the doors; both were consequently most particularly exposed to persons passing through, who may have received the contagion. The disease, generally considered, does certainly, at a later stage of it, attack a greater number; namely, when those previously seized come into communication with more persons who are predisposed; in the end fewer people suffer in proportion as the latter become less numerous.

If I add to my experience that of so many others, and consider the history of the epidemic itself, I think I am not wrong in being fully convinced that the cholera is contagious. With regard to the contagious properties of the cholera,

First. I consider them to be very volatile. Most of the persons attacked had* been in close communication with the cholera sick; at the distance of several paces the contagiousness was

* This should undoubtedly be read, 'had *not* been.'

demonstrable. Of the convalescents in A., none had touched No. 1; on the contrary, they had all kept at some distance, though in the same room. The female attendants only, Nos. 3 and 11, had rendered her the necessary assistance.

Second. I am of opinion the exhalations of the sick are the carriers of the disease, but only so long as they retain their vaporous form. I have given myself great trouble to ascertain if the clothes and linen covered with the perspiration of the sick were capable of transmitting the contagion; but I could not meet with any instance of it. Children taken from the cold, clammy breast of mother, or wet-nurse, and given over to another nurse to suckle, did not infect the latter. This occurred in my presence, in the case of No. 2, and with several nurses of sections B. C. and H. I do, however, believe, that where exhalations from sick persons are confined in a given space, as in clothes buttoned up, in hats, &c, and are immediately carried to persons in health, who are predisposed, they may prove contagious. Assuming this *à priori*, without being able to adduce a certain instance of it, which, indeed, I deem altogether impracticable, I think that most of those, to whom no contagion could be traced, contracted the illness in this manner.

Third. On account of the properties thus attributed to it, it must be infinitely divisible. Much divided or rarefied, it very probably loses much of its efficacy; in proof, I refer to the case of the six out of the one hundred and twenty work people above mentioned. All the windows of the cholera hospital were open night and day constantly, and opened to the place where they were at work, but the contagion was not propagated amongst the workmen, from its centre of emanation.

Fourth. From the above experience, I deem the shortest period that elapses between the infection and the first appearance of its effects, to be twice twentyfour hours. No duly authenticated document has, till now, proved what is the longest interval; it is, therefore, unknown.

From all this, I think I may conclude,

I. That the disease is not conveyable far by things, and most especially not during very hot, or very cold temperatures.

II. That in order to render effects or things brought from infected places or persons completely innoxious, it is only necessary to air them well, and particularly to convey through them streams of air. I have had the treatment of three hundred cholera sick, wholly, or in part, and yet I neither conveyed the contagion to my own residence, where eleven people live, nor to any other; which I can with full certainty maintain, because I paid particular attention to this object. I adopted no fumigation of my clothes, no ablutions, no sprinkling with scented waters. I never changed my clothes when I came from cholera patients. I had accustomed myself, from the commencement of the epi-

demic, after every visit to a person severely attacked, to walk about for a time, rather more quickly than usual, in the open air, with my clothes unbuttoned. I think I am indebted to the conscientious pursuit of this principle, for the above mentioned good result.

III. That when persons come from distant infected places, they do not so much require a rigid quarantine, but rather a long and close inspection, in order that, on the first appearing of symptoms, they may be closely shut out from intercourse.

Predisposition. My experience goes to prove, that full-blooded leucophlegmatic persons, with debilitated nerves — those subject to frequent difficulties of digestion, or to other defects of the lower regions of the body, or having a disposition to repletion, are most susceptible of the disease.

The predisposition is evidently lessened by strong exercise, particularly in the open air.

Children at the breast are incapable of being seized; not one of the seven hundred that were in the house, during the three weeks that it lasted in the same, sickened, although many of their nurses were attacked.

(Signed) PHILIPP DOEPP, Court Doctor,
Director-in-Chief of the Imperial Foundling Hospital,
at St Petersburg.'— pp. 143–147.

The following, which is also contained in the official reports of Drs Russell and Barry, is from a report of Dr Becker, of Berlin, (Prussia) to Mr Chad, the English minister in that capital. It is dated Oct. 12, 1831. It is a reply to this question, 'Whether, when the disease attacked one member of a family, the other individuals of the same family suffered from it.' Besides the immediate answer to the question, it contains interesting information.

Fourth. 'This is the case so frequently, that it may almost be considered as the rule, and the contrary as the exception, unless the patient be removed from his family. It is not possible to give any numeric returns of the recurrence of the disease in *families*, but the following is a statement of its reappearance in the same *houses* where it had shown itself:—

From Aug. 29th to Sept. 26th, there have been reported cases of cholera in Berlin, 770.

During that period, a second case has happened in the same house where one case had been reported.

After	one day - - - - -	65 times.
	two days - - - - -	34 "
	three days - - - -	23 "
	four days - - - - -	16 "
	five days - - - - -	21 "

After six days	- - - - -	7 times.
seven days	- - - -	3 "
eight days	- - - -	2 "
nine	- - - - - -	0 "

'In order to illustrate this point, it may not be superfluous to mention some instances of the recurrence of cholera in the same families and buildings:—

'A physician (Dr Calow), who had attended cholera patients, being at the time in bad health, and laboring under diarrhœa, died of cholera; on the day following, his landlord (Mr Steibelt) died; a day afterwards, two children of the landlord died, and the servant maid was taken ill of cholera, and recovered. The landlord's wife had been removed to quarantine. There have been no more cases of cholera in this street and its neighborhood.

'2. A family living on the river side, consisting of husband and wife, four children, and a servant maid, were *all successively* attacked with cholera; only the husband and one child survived.

'3. In a house (Alte Jakobstrasse, 66), the following cases of illness have occurred:—

1. Sept. 7th. W. M., 27 years of age, seized by cholera; recovered.
2. — 8th. Miss M., 32 years of age, with vomiting and purging; recovered after twelve hours.
3. — 12th. A boy of two years and eight months, son to a cutler, cholera; died on the 12th, after eleven hours' illness.
4. — eod. A journeyman of the cutler, vomiting and purging; recovered.
5. — 13th. The child of a tailor, aged two years and nine months; died of cholera after nine hours' illness.
6. — 15th. An apprentice of the cutler, vomiting and purging; recovered.
7. — eod. The man who had been in attendance on No. 5, took the cholera, and was sent to the hospital.
8. — 16th. Another apprentice of the cutler, vomiting and purging; recovered.' pp. 62, 63.

The last extract we shall make under this head is a summary statement by Drs Russell and Barry.

Fifth. '*Facts collected at St Petersburg, during the late Epidemic, illustrative of the spread of Cholera amongst persons employed about the Sick of that Disease in Hospitals.*

'*July 12th. Merchants' Hospital.* — Superbly fitted up, some of the rooms small, and not freely ventilated.

'Attacked — one purveyor, two feltchers or barber-surgeons, four servants — one dead.

'*13th. Hospital of the Semenoffsky Regiment.* — Attacked by the disease — three feltchers, seven servants — two dead.

'This hospital took in civil as well as military sick, towards the middle of the epidemic. The whole number admitted, three hundred and fiftytwo.

'21*st*. *Aboucoff Summer Hospital*, converted into a temporary cholera hospital. — Servants attacked, eight — died, three.

'24*th*. *Cholera Hospital at the School for the Sons of the Clergy*. — Of eight servants employed, two attacked.

'*August* 9*th*. *Hemp Merchants' Hospital*. — Of twelve servants employed, three attacked — two dead.

'12*th*. *General Military Hospital, Vibourg quarter*. — Physicians, three attacked — one died. Servants, twelve attacked — four died. Of twelve medical students employed *pro tempore*, all had diarrhœa and other slight symptoms.

'This hospital, at first purely military, and in the most perfect state of cleanliness and discipline, (as indeed all the Russian military hospitals are,) had few or none of its attendants taken ill. It was only after it had begun to admit civil cholera sick, and had become somewhat crowded, that the above casualties took place.

'14*th*. *Naval Cholera Hospital*. — Dr Seidlitz, chief physician, states, that of fortytwo attendants (two physicians), none were attacked. This hospital is composed of two detached buildings, standing in the middle of a field of about two hundred yards square, perfectly ventilated, and unembarrassed by other buildings on any side.

'15*th*. *Cholera Hospital of the Foundling Hospital*. — Of fortytwo attendants, fifteen were attacked, four feltchers included, of whom three were seized.

'*Hospital for the Imperial Stables at St Petersburg*. — Sick admitted, seventyseven : of seven servants employed, three were attacked.

'*Sept*. 10*th*. *Rogistevensky Hospital*, established in two inconvenient houses. — Physicians, five, and all the attendants of every description attacked.'— pp. 90, 91.

But it will be asked whether this question, as to the personal communication, and in short the whole question of contagion has now been set at rest by the experiments made in Poland; namely, the attempts to give the disease by inoculation. Several philanthropic physicians have made themselves the subjects of these attempts. They have employed the blood and excretions of the sick as the material for the inoculation. They have even taken into the mouth substances vomited by

the sick. And they have not suffered by these bold experiments.

Similar experiments have been made formerly to prove that yellow fever was not contagious. We must say that it is on other grounds we have been satisfied that yellow fever is not contagious.*

How often have the attempts to propagate measles by inoculation been unsuccessful? Who would attempt to communicate, in this way, the hooping cough, or the measles? The truth is that every contagious disease furnishes its morbid poison in its own peculiar mode; and, probably, applies it in its own peculiar mode. The instances, in which this poison is so furnished, as to be fit for inoculation by art, are very few.

2. Its introduction into various places has coincided with the arrival of persons from towns or cities, where it has been at the time or very recently prevalent.

How far this is true has been the subject of particular investigation, and in the great majority of instances nothing has been discovered in support of this proposition. In some instances there have been very strong assurances from the local authorities that the disease has commenced, when no person, or certainly no one affected with the cholera, had previously entered the place. This negative evidence deserves much consideration, yet it requires much of it to counteract a few well marked instances on the other side. There are not perhaps many such instances, but such as occur to us will here be stated.

First. The first of these instances we copy from the Edin. Med. and Surg. Journal, (vol. xvi. p. 460,) where it is extracted from the Bombay reports.

'Towards the latter end of the same month [July, 1818] it appeared in the city of Poona, although the troops encamped in its neighborhood continued healthy for some time after. On the 6th of August it broke out with great violence at Panwell, a considerable village on the main line of communication between Poona and Bombay, separated from the latter by an arm of sea, and distant about 15 or 20 miles; but between which a pretty constant communication is kept up by means of boats. On the 9th or 10th of the same month the first case appeared on this Island, and, as appears by Dr Taylor's report, could be traced to a man who had arrived from Panwell the same day. It is also evident by Dr Jukes's report, that it spread north and south along the sea coast from the same place, and that it was imported to a village in the neighborhood of Tannah on the Island of Salsett, distant

* See Appendix B.

from this place about 20 miles, by a detachment of troops that escorted a state prisoner to that garrison from Panwell. The disease did not break out at Mahim, on the extremity of this island, distant only five or six miles from the principal native town of Bombay, until it had been established in the latter; it then gradually spread over the western side of the Island of Salsett, through which the road from Bombay, to Surat and the northern countries lies, and by which, during the southwest monsoon, is the principal line of communication. By the observation of some individuals who, aware of the danger of the malady, and with the humane view of relieving the sufferings which it inevitably produced, carefully watched its progress, we are enabled to trace the disease as if creeping along from village to village on that island precisely in the same way, that is, by the arrival of people affected with the disease from places where it was known to prevail; and we are assured that there are some small villages on that island which, from want of this sort of communication, or from some other cause, have, after a lapse of four months, hitherto escaped entirely.'

Second. The second instance is from Kennedy, and is taken by him from Surgeon Juke's statements contained in the Bombay reports.

'It will not have escaped your observation, that the cholera travelled along the high road from the Deccan to Panwell. I have not yet heard of any village in the Conkan that has received the disease, unless by having had intercourse with the places previously infected. It is worthy of remark, perhaps, that the first person seized here, the 13th of August, was a man who belonged to a detachment which left Seroor on the 28th of July, while the disease was very general there. Several men, also of the same body, fell ill of cholera during the march, and were sent into Poonah. This detachment, which escorted the state prisoner Trimbuckjee to Tannah, came by water to Panwell, and landed at Chundnee the evening of the 12th of August. It was at Chundnee where the disease first appeared on this island.

'I have had no reason, however, to say that the cholera has been contagious at this place. Neither myself nor any of my assistants, who have been constantly amongst the sick, nor any of the hospital attendants, have had the disease. It has not gone through families here, when one has been affected. In many particulars it is very unlike common contagion. But at present there is considerable obscurity about this singular malady. The laws by which it has been moving from place to place are very unlike those of the generality of epidemics.

'If the exciting cause be something in the atmosphere, which

has exercised its influence from Bengal to the Deccan, how did it come directly against the southwest wind that has been blowing upon this coast since June? How does it happen that the winds from the ocean still spread the disease? And if it be something general in the atmosphere, why has it not hitherto made its appearance in some two distant parts of the province at the same time? Nothing of this kind has, I believe, been observed. It still seems to be creeping from village to village, extends for a few days, and then begins to decline.

'In order to afford you every information in my power, I will just add, that, to common observation, there has not been any thing peculiar in the weather. The barometer has not been either remarkably high or low. The thermometer, for the last month, has scarcely ranged more than from 76 to 82 degrees: and during many days has been nearly stationary at 78 or 79 degrees. — p. 80–82.

The committee have thought it best to include in the above Mr Juke's reflections upon the cause of the disease, as they obviously come from a candid mind, and are connected with some useful observations. What he says as to the mode in which the disease spreads and as to weather is confirmed by many other medical men in India.

Third. The third instance is from the Madras reports quoted by Kennedy.

'There are several instances recorded where the cholera has been first manifested at a place, in the attack of an individual, who had come from some other place where the disease existed. The first of an European which occurred at St Thomas' Mount, was of a man who had left Madras on the morning of the 15th of October. Proceeding on his journey towards Trichinopoly, in the evening he was taken ill about a mile from the Mount, brought back to the house, where he had passed the day, and there died. On the 17th the wife of that person; on the 19th the owner of the house; and on the 21st his wife; all experienced attacks of cholera, but recovered. Several of the native servants also suffered. The instances of the disease appearing at places immediately after the arrival of corps and detachments, which were suffering from it, are very numerous. For example, it appeared at Jaulnah, immediately after the junction of a party from Nagpore, amongst whom it prevailed. It appeared at Aurungabad, and at Mulligaum in Candeish, after the arrival of parties who had left Jaulnah at the time the disease was prevalent there, and amongst whom it had broken out on the march to these places. It appeared a second time at Mulligaum after the junction of the first battalion, 5th regiment, in which cholera

MAP
OF THE PRINCIPAL PLACES IN
HINDOSTAN,
VISITED BY THE
Contagious Cholera,
From August 1817, to January 1819.

70 75 80 85 90 95

35 30 25 20 15 10 5

AFGHAUNISTAUN
Great Sandy Desert
River Indus
Lahore
Deyrah Doon Oct.r 2.1818
TIBET
Himalayah Mountains
NEPAUL
Saharunpore
Almora Aug. 10. 1818
Delhi July 20. 1818
Jumna River
Ganges River
DOAB
Catmandoo June 1818
OUDE
Meerut
Muttra
Jeypore Aug.
Agra
Futteghur
Lucknow Apl. 1818
Cawnpore
Etawah
Chumbul River
Fyzabad
Gorruckpore
Tirhoot
Muzufferpore Nov. 1817
Purneah 1817
Jinagepore
Rungpore
Brahmaputra River
Sinde River Nov. 6. 1817
Betwah River
BUNDLECUND
Allahabad 1818
Benares
Patna 1817
R. Ganges
BENGAL
Kota June 1818
Sonara
Rewah 1817
Silhet 1817
Moorshedabad 1817.
Dacca 1817
MALWAH
Saugur April 1818.
Nuddeea
Hoogly R.
Burdwan
JESSORE Aug. 1817
Oojein May 9.
Inbbulpore
Husseingabad
CALCUTTA Aug. 1817.
Chittagong
Nerbuddah River
Mundelah
Kedgeree
Sunderbunds
Mouths of the Ganges
CANDEISH
Surat
Balasore 1817
Mooltay
Nagpore May 25. 1818
Mahanuddy R.
Cuttack
Chandah
Aurungabad July 10.
Jaulnah July 3
Salsette
BOMBAY Aug. 10. 1818
Panwell Aug. 16. 18
Ahmednuggur July 18.
Ganjam March 20. 1818
Seroor July 21.
Godavery River
Poonah July 30.
Punderpoor July 11.
Hyderabad July 25.
Vizagapatam May 15.
Tannah
Belgaum
Kistnah River
Masulipatam July 10.
Goa
Bellary Sep.r 6.
Ghooty Oct.r 6.
Penner R.
Nellore Sep.r 20.
MYSORE
Soonda Sept.r
Nundydroog
Tripetty Oct.r 1.
Seringapatam Nov.r 6.
MADRAS Oct.r 8. 1818.
Arcot Oct.r 13.
Cavery R.
MALABAR
COROMANDEL
Cannanore Dec.r 5.
Cuddalore Nov.r 14.
Comboconum Nov.r 20.
Trichinopoly Nov.r 1.
BAY OF BENGAL
Cochin Dec.r 8.
Madura Nov.r 30.
Ramnad
Travancore
Trivanderam Jan.y 1819
Paumbetta Jan.y 1. 1819
C. Comorin
Trincomalee Dec.r 1819
CEYLON
Candy
Columbo Jan.y 1819
INDIAN OCEAN

Annan & Smith Sc.

prevailed. It appeared at Secunderabad after the arrival of a detachment suffering from it; and it appeared afterwards in the villages through which the detachment had moved. It appeared at Ghooty, where no case had been observed for six months before, immediately after the arrival of the first battalion, 16th regiment, in which it prevailed with great mortality. It is remarkable, that the same formidable type of the disease which prevailed in the marching corps, was communicated to the corps at Ghooty. It also spread on that occasion to the adjacent villages. It appeared in a detachment of artillery, previously perfectly healthy, upon their encamping on the ground, which had been immediately before vacated by the first battalion, 8th regiment N. I. in which corps the disease prevailed: the bodies of several persons, who had died of cholera, remained exposed on the ground, when it was taken up by the artillery. Moreover, marching corps and detachments have been seized with cholera on coming to places where it was prevalent.'— p. 244, 245.

Fourth. The following is copied from the Edinburgh Medical and Surgical Journal for July, 1831. This journal derives the statements from the Russian official reports, which are among the original works, to which we have not yet had access.

"An important fact which appears favorable to the notion of contagion is that the disease broke out in some places very soon after the arrival of persons ill of cholera who had recently left districts where it prevailed. Several instances of this are reported. Thus, the first place where cholera appeared after it broke out at Orenburg was in the fortress of Razüpna, 60 miles to the westward, down the course of the river Oural. Here it commenced on the 19th September, passing over several forts and villages on the highway, which, nevertheless, we shall presently find, were attacked subsequently; and it is said, that the first person attacked was a vintner's servant on the very day he arrived from Orenburg, and that the disorder seized several of the garrison four days afterwards. — Again, in the fortress of Iletsk, 42 miles to the southwest of Orenburg, and on the verge of the Kirghis-Kaisak Steppes, the disease did not break out till the 2d of October, and first appeared soon after the arrival of a soldier, and a soldier's wife, who were taken ill on the way from Orenburg, and died on the day after their arrival at Iletsk. Three days after their death three individuals took ill in the garrison, one of whom was the husband of the woman. — Another incident of the same nature occurred towards the close of the epidemic at Caramala-Gubeewa in the northern part of the Orenburg government. This village had remained healthy till the 14th of January; but about this time a peasant arrived from a

village 24 miles distant, where the disease prevailed, and died of it immediately after his arrival; whereupon this man's nearest relations were attacked; and immediately afterwards the disease spread among the inhabitants, so that in a short time 41 were attacked, and 20 died. Besides these special facts, there are also some general, but rather vague, statements in the Reports, to the effect, that in no instance did a person go from a district where the cholera prevailed to another where it did not, and then take it, without the disease soon afterwards attacking many people in the neighborhood."

"Cholera first appeared on the frontiers of the Astrachan Government on the 3d July, on board a ship of war, which had arrived from Baku, (350 miles down the Caspian,) and lay sixty miles from Astrachan. Till the 20th of the month the disease was confined within the Sedlitovski Lazaretto, whither the vessel with the sick had been brought. But on that day four people were taken ill in the city, near the river Kutum; and from this point the disease imperceptibly spread over the whole town, carrying off a great number of people. After the 27th it attacked the suburbs, then the nearest villages, and then gradually extended over the whole Government. * * * In reaching Astrachan from Baku it passed over all the intermediate districts of the Russian territories. * * * The first places attacked after Astrachan were several Tartar villages in the immediate vicinity, at a distance of from two to four miles, the inhabitants of which were in constant communication with the town, and to which also many families fled out of it as the disease spread. On the 27th July it also appeared in the village of Tscherepacha, eight miles from Astrachan, on the return of some inhabitants, who had been to the town in search of work, and one of whom was the first person taken ill. After the 29th it proceeded through the Kossack stations and the town of Enotaevsk, on the highway to Moscow, up the stream of the Wolga, its extension in this direction evidently accompanying the fugitives from the places successively attacked. In the town of Enotaevsk it spread with the arrival of a sick boor. On the 29th July a barge arrived at Tchernojar, 150 miles up the Wolga, with several rowers on board, who were ill of cholera. On the 8th of August the disease began to prevail among the inhabitants, and then passed across the river among the neighboring Kirghis, as well as upwards to the villages of Solodnikovsko and Vaisovka, in one of which the first person attacked was a military prisoner, who had been exposed to the disease. On the 25th July the epidemic also began in Krasnojar, situated on the northern mouth of the Wolga, twenty miles from Astrachan; and it first seized a private of invalids and a girl of thirteen years of age, who had both recently come from that capital. On the third of August it ap-

peared in the estate of M. Nekrasov, ten miles from Krasnojar, and among the Algarin hills in the vicinity of the town; from which it finally extended down to the Cossack cordon on the Caspian, between which and Krasnojar there is constant communication. While the disease prevailed in Astrachan some fishermen were there from Makovsky and Schitinsky, two places on the shore of the Caspian, where the Wolga opens into it. These men, terrified at the progress of the epidemic hastened home, to place themselves, as they imagined, in security. But they had already imbibed the poison; some fell sick on the way, others after arriving at their homes; and the disease soon spread throughout the community to which they belonged.

'"On the 2d of August the salt-depot of Basinsk in the Caucasan kingdom, ten miles from the highway, was subjected to the general pestilence. On the first of the month an Armenian, convalescent from cholera, arrived at the house of a private of the depot guard, who was taken ill and died next day; and other cases occurred afterward. At the salt-depot likewise of Kigatska, twenty miles from Krasnojar, a private soldier was taken ill whom I had sent thither from Astrachan, with medicines and instructions for the inhabitants, in case the disease should appear among them; and various individuals were attacked subsequently."

'After these interesting particulars he goes on to state that in Astrachan many instances occurred where the greater part of the members of a family were taken ill in succession, and that local causes appear to him inadequate to account for the disease prevailing epidemically, for the two seasons previous to 1830 were much more favorable than it to the extension of a disease of local origin, as the country was much flooded. He has unfortunately omitted to tell us in what manner the cholera was supposed to have passed into the city of Astrachan from the Sedlitovski Lazaretto; but he observes that suspicions were entertained of cases having occurred before the 20th of July, although they were not reported to the police.'—pp. 128, 129, and 140, 141.

Various other instances might be added to the foregoing, and some have already been introduced in other parts of this report, which might also be placed here. Especially the instance of Cronstadt might be adduced, into which place the disease seemed to have been carried from St Petersburg, as appears from the official reports of Russell and Barry. But, as the evidence is circumstantial, and would occupy a large space, it is omitted.

The following from Mr Kennedy is supported by sufficient evidence, and is introduced here as according with the state-

ments under this division, though not exactly supporting the proposition at the head of it.

'Among the islands of the Indian Ocean, it was observed that the cholera uniformly commenced its ravages in the seaport towns, or in those towns seated a few miles inland, which have a constant intercourse with their harbors at the shore. In the island of Mauritius, the disease first appeared in the town of Port Louis. In Bourbon, the town of St Denis was the first attacked. In Java, the town of Samarang, and so of the islands Sumatra, Penang, Borneo, Celebes, Lucon, &c. In the Persian Gulf, also, the same order of infection was observed. Muscat, the principal trading port town, first received the disease. Then, the port of Bahrein, and Busheer and Bassora.'*

To the foregoing it may now be added, that the first acknowledged cases in Great Britain were likewise in a seaport.

3. The introduction of the disease into various places has been prevented by a rigid system of non intercourse.

In support of this proposition may be stated various facts, the value of which must be considered afterwards. Some of them perhaps are stated in such general terms as not to give the greatest assurance of their accuracy.

It was observed in India that prisons were in some instances exempt from the disease; the inhabitants being preserved by the walls which confined them. In the island of Bourbon the disease did not go beyond St Denis, this place having been cut off from all communication with other parts of the island. The Cape of Good Hope is thought to owe its immunity from the disease to its strict quarantine. Ispahan was said to preserve itself from the epidemic so long as its gates were closed; while the caravans, to which it refused admittance, were supposed to carry the disease to Yezd, where they were more hospitably received.

But there are instances which are less subject to dispute than these. Such are the following.

First. The French Consul near Aleppo shut himself up with many friends and attendants, and they all escaped the cholera, though it was prevalent all around them.

Second. '"Many gardens and farms in the neighborhood of Astrachan remained exempt from the epidemic, having broken off all intercourse with the diseased districts. In many villages, too, where similar measures of security were taken, the issue was equally fortunate, although the cholera raged all around them, — for exam-

* Kennedy's History of Cholera, p. 251.

ple, in the lordships of Smirnov, Beketov, and prince Dolgoruki, in Sarepta, eight miles from Zaritzin, and some other places. On the other hand, the Kalmucks, who, as soon as the disease appeared among them, left their sick comrades behind them and repaired to pasturage-grounds fourteen miles off and more, did not in this way get rid of their fatal visitor: fresh cases occurred among the families who were first attacked." '

The foregoing is quoted from the Russian official reports in the Edin. Med and Surg. Journal for July, 1831, p. 142.

Third. The academy of military cadets at Moscow, which is represented as a large establishment, escaped the disease altogether, while it was in that city. All communication with persons out of the establishment was prevented, and to this cause the exemption of its inmates from the cholera was attributed.

Fourth. '*School of Cadets at Cronstadt.* — There were 150 pupils on the officers' side, which is kept perfectly distinct from the school, for petty officers and sailors. The gates were shut on the 19th June, and as strict a quarantine as possible maintained to the 6th August (O. S.) No case amongst the pupils, who are from nine to twenty years of age. The general health of this establishment was rather better than usual during the epidemic.'*

The facts communicated under this head certainly have great weight. Yet they must not be regarded as decisive. Various places have equally escaped the disease, when surrounded by it, without any precautions against its entrance. Even more; when a few cases have occurred in some places, the disease has not spread. This immunity may have been owing to something peculiarly salubrious in the atmosphere of these favored spots. Or it may be owing to the good habits and vigorous constitutions of the individuals living in those places. This last is the explanation of the escape of many Europeans in India, while the natives and others about them were suffering under the epidemic.

Under this head may be placed the following striking instance from Russel and Barry's official reports, p. 35.

Extract of a Letter from John Booker, Esq. His Majesty's Vice-Consul at Cronstadt.

'July 26, 1831.

'It is utterly impossible to account for the nature of this fatal complaint, as its attacks are most capricious, and the methods of cure are as various as incredible.'

'The small village of Tolbuhin, mentioned in my letter of the 28th May, containing a population of about 150 inhabitants, and

* Russell and Barry's Official Reports, p. 52.

in daily communication with this place, as it supplies the town with milk and vegetables, has escaped the visitation entirely, and not one being to this day has fallen a sacrifice to the complaint, or had an attack; therefore to them it has been neither epidemical nor infectious, though their manner of life is not in any way different from the inhabitants of this place.'

Various instances similar to the foregoing might be quoted. The failure of the sanitary cordons and measures of quarantine to protect Russia, Prussia, Austria and Great Britain is also considered as militating with the principle now under consideration. We think however that a just view of those measures will show that such a failure might be anticipated, except perhaps where the communication was by water only.

The intercourse among mankind is not conducted on great thoroughfares only. It is also kept up through by-paths that can hardly be watched. Many of these by-paths are known only to those, who live in obscurity and whose travels are almost limited to them. Yet they may occasionally serve for the passage of men bent upon the attainment of their own mercantile, or political objects, and who are regardless of the public welfare. In short there is a pressure upon the borders of every country, by those without, not felt when not resisted, yet almost irresistible. The presence of men in such a case is like that of water, which will find itself an outlet; if it be dammed up it escapes at some times in little rills, as well as at some times in a mighty flood.

Let us compare the two different modes, in which the attempt is made to guard against the introduction of contagious diseases. First. Reliance is placed on walls of stone, or inanimate matter. This can be done only to a small extent; at most it can be applied only to a city; and not long to a city or any place containing many inhabitants. In such a place it is not done rigorously except by a military siege and rarely then. In small establishments it may be done. Of this kind are several instances already enumerated under this head.

Second. Reliance is placed on troops and officers of police. Here it is not an inanimate wall; it is a wall of men. These men are to guard the lines of an extensive country and especially to watch all the roads and passes.

But let the cordons be doubled or tripled, as has been done by the governments in the north of Europe, they do not make a wall of stone. They leave spaces through which men may creep even by day, still more by night. 'At Stralkowe,' says M. Briere de Boismont, 'upon the frontiers of Prussia, where

I was kept in quarantine, we were annoyed every night by the firing which was directed against those, who were engaged in carrying on a contraband trade. This trade however was not stopped for a moment. Yet I could never find that any one had been killed by the bullets, the discharge of which disturbed our slumbers. At least if there were any such they must have been very few in number.'*

Troops cannot guard every point. But, if they can, they will not. They may fall asleep or they may be put to sleep. At many posts there must be men hired at sixpence a day. Double the silver or use gold in its stead, and these men will accommodate an urgent traveller. In these ways many may and no doubt do pass through a military guard. If one is afterwards affected with the dreaded plague, is it to be supposed that he or his friends will report his case to the police, or to the officers of health, in the country into which he has thus surreptitiously found his way ?

But, besides all this, the troops, who are opposed to the inroad of the disease, are themselves susceptible of it. They may be compared to a wall of fagots extended through a street to stop the spreading of a fire. Such troops may indeed arrest those who come freighted with a contagious malady. But they must themselves, some of them, become its victims. They may be watched and sent to a hospital when sick. But there will be individuals, who will find friends in the country where they are stationed, and who will dread a military hospital sufficiently to seek a shelter among such friends. On this point we might adduce an instance from Egypt where the troops were known to be affected with the disease they were designed to ward off. If the whole truth could be known, we do not doubt that on the borders of Prussia and Austria the same thing could be demonstrated. The military forces did not shut out the disease from those countries ; and this is urged as evidence that this disease was not contagious. We maintain that the evidence is not satisfactory, though the conclusion may express what is true.

4. The extension of the disease from Indostan has been gradual, never too rapid to have been carried by man ; it has been in all directions and in continued lines ; it has been in opposition to the course of the winds, as well as in accordance with that course ; it has been very little influenced either by climate or the season of the year; and it has continued for many years, under all varieties of weather. These circum-

* Relation historique et medicale du cholera morbus de Pologne. p. 163.

stances are not in acccordance with ordinary non-contagious epidemic diseases. They may be explained on the supposition that the disease is contagious.

A brief review of the history of the disease, in its migrations, will show how much this argument is to be relied on.*

Let us take up the history in 1818. We may regard the disease as having established itself in Bengal in 1817, by originating in many similar situations from the influence of climate. This is highly probable, as may be admitted on both sides, but it is not material to the argument whether it was so or not.

The disease was extended widely over Bengal in 1817. It had in some measure subsided there in December; but with the return of warm weather in February and March, 1818, it became more severe and more prevalent in Calcutta and elsewhere. Looking to the south, we find it progressing regularly from Calcutta until it reached Cape Cormorin, the southern extremity of the peninsula of India, in January, 1819; and on the west we find it at Bombay in August, 1818. Looking to the intermediate places, we observe that it passed them in a nearly regular succession to reach these points.

In traversing the extensive country just adverted to, it sometimes passed by a town of some size, seeming to go round it; and subsequently it showed itself in the place thus passed over without being observed to traverse again the intermediate places. This has been urged as an evidence that the disease was not contagious. But perhaps this argument is more specious than solid. If, for instance, such a disease had been moving westward from Boston to Northampton, it would not necessarily keep in the most travelled road, through Worcester; pursuing another course, it might pass round that large town, and be said to have gone by it. The neighboring towns might have undergone the disease. Yet it might afterwards reach Worcester through some unobserved line of obscure and scattered habitations.

Reaching Worcester in this way, and finding there an abundant population, it would attract observation by its spreading and devastations, and yet the road by which it had entered might not be discovered. Such a course would be possible in a country like ours; and, probably, if we were to observe the course of the measles, in their frequent peregrinations through our land, similar instances would be discovered. But in a

* See Appendix, C.

country, where the intercourse is less regular and less constant between its various parts, as in Indostan, such events might be presumed to occur not very rarely.

In subsequent years, the disease of which we treat was found in succession in the countries to the east and south of Indostan. It reached and passed through China; and from the northern parts of that country, through some barbarous hordes, it is said to have found its way into the northern parts of Russia in 1829. It likewise extended through the islands on the south, so as nearly to reach New Holland.

Omitting to follow the course of this fatal epidemic in those directions, let us attend to its progress from Bombay toward Europe; that is, in a north and west direction. Elsewhere it extended for the most part in climates comparatively warm, but in this course it ultimately arrived at nearly the coldest climates inhabited by man.

The disease continued, though not constantly, to afflict Bombay till 1821, and in that year it appeared at Muscat, at the mouth of the Persian Gulf. Between this place and Bombay there is a constant traffic. It has been asked, why the disease had not been propagated before by some of the numerous vessels passing between these places. It may not be easy to answer this question satisfactorily; yet it is not difficult to imagine some reasons why it was not so propagated. But its propagation from Bombay is rendered probable, because it did not appear in any other place around the Gulf of Persia before it did at Muscat, the most convenient place for its introduction from Bombay. Having reached Muscat, it spread soon after quite extensively up the Gulf of Persia and beyond it. Passing up the south side of the Gulf, and on the banks of the Tigris, it reached the shores of the Mediterranean in 1823, viz. Aleppo, Antioch, and other places. On the north of the Gulf it extended from Busheer in 1821 to Shiraz, Ispahan, and Yezd, in Persia. We may refer to the accompanying maps, on which we have endeavored that the dates shall be correctly affixed to the several places in which it subsequently appeared. It will there be seen, that it was at Astrachan twice; the first time in 1823, the second time in 1830. Astrachan is at the mouth of the Volga, on the northwestern shore of the Caspian Sea. In observing its general tendency to the westward, it might well have been feared in 1823 that the disease would pass from these places into Europe. Such apprehensions were accordingly entertained and expressed at that time; but as they were not realized, they were afterwards forgotten or regarded

as groundless. The disease, nevertheless, continued to prevail in Persia. We do not find any exact accounts of it in that country, but only learn generally that it had continued to 1830, showing itself yearly in one or more places. The following brief statement by Mr Kennedy shows its course in that eventful year, from the borders of the Caspian Sea to Moscow, the ancient capital of Russia, and in the following year to Poland and to the capitals of Prussia and Austria.

'In Persia the pestilence reappeared every year for several years in succession, prevailing to a greater or less extent in localities that had been previously infected.

'Of these repeated attacks, the one which commenced in 1830 demands the greatest share of attention. It overcame the natural and artificial barriers opposed to its progress, and eventually succeeded in penetrating to the heart of Europe. This European stream of the contagion (as it may be called) began on the western side of the Caspian, and, extending northward, it ravaged the town of Tauris in the month of June. Afterwards, crossing the Russian frontier into Georgia, it entered Tiflis, and carried off several thousands of the inhabitants. In the meantime, Baku was again invaded; and by the 20th of July, the cholera appeared once more in the city of Astrachan. A vessel in which cases had occurred during the voyage, was recently arrived from Baku. In Astrachan the mortality was considerable. At the expiration of ten days, 1,229 individuals had been seized, of whom nearly one half died, including amongst them the civil governor and almost all the officers of police.

'In Russia the cholera observed the same laws that had marked its progress in India and other countries. Adhering for some time to the route of navigable rivers and high roads, it attacked, in the first instance, the boatmen, the travellers, and the towns situated on either side of these lines of general communication. In this way it ascended the Volga, and where that river approaches the Don, a branch of the contagion took an over-land course, and arriving at the Don, diverged in a northerly and southerly direction along its banks. On the Volga the towns were invaded in the following order of time: for example — Astrachan in July, 1830; Tzaritzin, Saratow, and Novogorod in August; Kostroma, Jaroslaw, and Moscow in September; Samara, Sinbirsk, Kasan, and Vladimir in October.

'As the contagion had now become firmly fixed in numerous localities of the Russian empire, it continued to extend from these localities in various directions. Two remarkable branches proceeded in a northerly and southerly course. From Vologda, on the Dwina river, one of these spread towards Archangel; the other accompanied the Russian troops in the invasion of Poland.

'During the summer of 1831, the progress of the pestilence has been exceedingly extensive. In April it commenced its ravages in Warsaw, and since that period it has travelled westward to Dantzic and the gates of Berlin and Vienna; northward to Archangel, and southward beyond the Danube. In short, few towns have hitherto escaped in that immense tract of country which lies between the river Volga, the Baltic Sea, and a line passing through Berlin and Vienna; and between the White Sea, and the Balkan Mountains in European Turkey.'*

Of the mode in which the disease was admitted into Astrachan we have already stated the account, which is in support of its contagious character. The same may be said as to its introduction into Cronstadt. But, of the mode of its entrance into Orenburg, Moscow, St Petersburg, Berlin, Vienna, and various other places, we do not find any similar explanations, or none which are satisfactory. If positive proof of its introduction in these cases be required to support the cause of contagion, that cause cannot be maintained. It is contended, however, that this proof is not requisite, it being highly probable that among ignorant people the necessary facts were not noticed; and that among the low and debased people of cities, in most parts of the world, the truth might be concealed, when known, because it would be connected with infractions of the laws, or of the orders of government.

An account given by Dr Hamet, of the disease in Dantzic, where it occurred in 1831, states most explicitly that the disease was not imported into that place, and offers much evidence in support of this statement.

In regard to Poland, we have a history which gives some positive support to the doctrine of contagion.

An account of the disease in that country, where it appeared in April, 1831, is given apparently with great accuracy and impartiality by M. A. Briere de Boismont, a physician of Paris, one of the two first physicians sent from France into Poland. By the account of M. Briere, a battle was fought on the 10th of April, in the environs of Iganie. In the night between the 12th and 13th of April, twelve Polish soldiers were suddenly seized with the disease. Every one wished to believe that these were common cases produced by fatigue, bad position, &c; but the deception could not be maintained. Within three days the disease was in Praga, and in a few weeks it was extended over Poland in every direction. In the meantime it

* Kennedy's History of Cholera, pp. 212 -- 214.

was fully ascertained that the cholera existed in the Russian army with which the Poles were engaged on the 10th of April. M. Briere de Boismont states at the same time, that the disease scarcely affected an individual who was not predisposed by the habits and circumstances, which have already been pointed out, as giving an inlet to it. It must be noted, however, that the accounts given by this author are not all of them admitted by his opponents. Indeed it is well settled, that the disease had entered Poland in December, 1830; but it did not extend through the country till the following spring, as above stated.

The cholera had now arrived in the heart of Europe. It spread from Poland to Prussia and Austria as has been mentioned. Early in October, 1831, it appeared in Hamburgh and late in the same month it was recognised at Sunderland on the eastern shore of England. Its progress in Great Britain has not hitherto been rapid and the alarm excited by its approach and first appearance has in great measure subsided. At first it spread from Sunderland to the nearest towns and villages; but subsequently has shown itself in various more distant places. In the Appendix there will be found further information on this point. Last of all, the disease appeared in Paris just at the close of March last, and within a week it increased there very rapidly and was exceedingly fatal. No information has been received by which we can judge whether the disease arose by communication from diseased countries or not.

We had hoped that the arrival of the disease in England would have been so watched as to decide whether it was imported there from the continent. From the advantage of its insular position, together with the intelligence of its inhabitants, it was supposed that this question might have been more easily settled in Great Britain than in almost any other country. It is certain that no distinct account of the introduction of the disease from abroad has been published; or none such has reached us after diligent inquiry. And yet there has not been given such a distinct and clear history of the circumstances, attending the first victims of the disease, as to satisfy us that they did not directly, or indirectly receive it from the continent.

A vessel, as it was said, had arrived at Sunderland from Hamburgh shortly before the disease appeared; and by the party who believe in contagion it is said that, although this vessel was subjected to quarantine, the measures adopted for this purpose were such as to give no security. Besides, it is urged that Sunderland was most favorably situated for the introduction of the disease from the neighboring shores of the continent, on

which it prevailed; particularly from Hamburgh. In regard to the persons first seized, we learn that they were among the lowest order of the filthy poor, such as were very likely to be exposed to illicit communication with persons infringing the laws of quarantine. They died before any general alarm was produced, and there was not an opportunity for an inquiry of them as to any recent exposure.

If we were to form our opinion from the history of the disease in Sunderland, we should say that the case was not made out in favor of the importation of the disease from the continent of Europe. The disease was indeed on the nearest shore of the continent, and Sunderland was one of the points at which its easy admission might have been anticipated. But it may most fairly be urged that, if the disease was imported into a port, where guards were set to watch against it, under the control of men who believed in its contagious character, those men being appointed and supported by the government, the facts might have been brought to light. We do not say that under these circumstances the quarantine could not be violated. Except among an intelligent and moral community, convinced too of the necessity of an effectual quarantine, we believe the violation very possible, and even highly probable. But, after it had happened, the facts might be ascertained by intelligent men, clothed with power, though they could not have prevented the occurrence. The facts then not having been made out to show the importation of the disease, this circumstance operates strongly to prove that no importation took place.*

In regard to the mode of communication of the disease from place to place, in Asia and in the north of Europe, we have not thought that much reliance was to be placed on the accounts we have received, whether favoring one side of the question or the other. On this account we have omitted many of the statements derived from those countries in relation to this

* The foregoing was written in April. One cause of delay in publishing this report has been the desire of the committee to obtain more perfect and exact information respecting the cholera in Great Britain. Some accounts they were receiving from day to day; but they were not sufficiently precise, nor was it easy to decide how far they were entitled to credit. On the 11th of May, when the report had just been finished and was ready for the printer, Johnson's Medico-Chirurgical Review for April was received by the committee. This Review contains some information of the character which might be looked for from British physicians. It is mentioned here to explain any discrepancy which may appear in the foregoing remarks and some which may follow. The information alluded to will be introduced under another head and in an Appendix to the report.

point. Such is the state of society in them that, unless under peculiar circumstances, the existence of the disease in a city or village would not be noticed, until it had proved fatal in a number of instances and until its source could not easily be traced among an ignorant and rude people.

So far then reliance is to be placed, by those who maintain the propagation of the cholera by contagion, on the general history of its extension, more than on the accounts of its introduction at each place it has invaded. The committee wish not to press this consideration too strongly, but they desire that the force of it should be distinctly seen. For this purpose they beg that the maps should be carefully studied, and that the diversity of climate in the countries traversed by the disease be duly kept in mind. Especially let the disease be traced from Muscat to Persia, to Syria, to Egypt and to Archangel in the north of Russia. In these various directions we never find it passing from place to place faster than it could be carried by man. It does not always travel so fast as man ; nor perhaps does it always keep the roads, on which most men are travelling. But it never takes the wind for its vehicle to outstrip man in the race ; or at least this does not appear from the history.

The tendency of the epidemic to extend in one particular direction from southeast to northwest has sometimes been asserted. But such a tendency has not been shown. It has not been confined to one line of march. It reached the confines of Egypt, as well as those of Russia, in 1823, when its course was arrested at both points. Again, in 1830, when its violence was augmented in Persia, it approached Egypt, as well as Russia, with a surer step ; and since then it has committed great ravages in Cairo and Alexandria. The last year it reached Smyrna and Constantinople, as well as St Petersburg.

It has often been asked, if the disease be contagious, why does it leave a town or city, while a majority of its inhabitants have not been affected? When it enters a new place it generally spreads very rapidly, and if this spreading be owing to contagion, it would seem that this contagion is of the most active and powerful kind. If this be the case, should we not presume that the great majority of men must be liable to its influence? But, in point of fact, it is only a small minority who undergo the disease, in most places where it gains a footing.

Perhaps this question does not admit an answer consistent

with the doctrine of contagion. Let us consider it. First, it may be answered that the argument is quite as good against any other cause, which can be assigned, as against contagion. If the cause, be it what it may, can suddenly affect a great number of persons in a city, why does it not affect all? This leads us to remark, second, that this argument arises from a disposition to assign laws to contagious diseases, rather than to learn what those laws are by observation.

If we will attend to the history of contagious diseases, we shall find that there is not one, which can at all times be produced in every person exposed to its influence. Also, in some seasons a contagious disease is propagated much more readily than in others, so that some atmospheric changes are presumed to favor its propagation. This is true of many contagious diseases certainly, and those the most formidable and most easily communicable through the medium of the atmosphere, such as measles and small-pox. But there are persons who resist these diseases under all circumstances. Hence we may say that there may be in some persons a positive indisposition to be affected by a particular contagion; and likewise that in many others there may be produced a more ready disposition to be so affected in particular seasons. So much we learn from observation of various contagious diseases. It is impossible to decide beforehand how large a proportion of men are liable to be affected by any disease, whether contagious or not. It is not therefore an evidence that this cholera is not contagious, although nine men out of ten should not be found susceptible of it. It would not be admitted as evidence that malaria was not generated in the site of a new village, because in the first year of its occupation by a thousand settlers only one hundred should have intermittent fever.

On this head then we may conclude that, if the spasmodic cholera be contagious, it may be that different men are susceptible of being affected by the disease more or less readily and with corresponding degrees of violence, the first affected in every place having the disease most severely. This at least comports with the facts noticed in many localities. The disease has been most severe and most fatal during the first two or three weeks and has gradually become less so. Meanwhile, the number who have escaped it entirely may be less than has commonly been stated. A large number may undergo the disease in so mild a form as not to be much regarded. We are told, and by persons who deny contagion, that during its preva-

lence in a city it has been observed that a great majority of the inhabitants have felt some of the symptoms which belong to the disease, but not so severely as to desist from common occupations; while others who are obliged to yield, are affected with different degrees of violence. The same is true as to small-pox and measles; so that if there were not eruptions by which these diseases are identified, their occurrence would not be suspected in many cases.

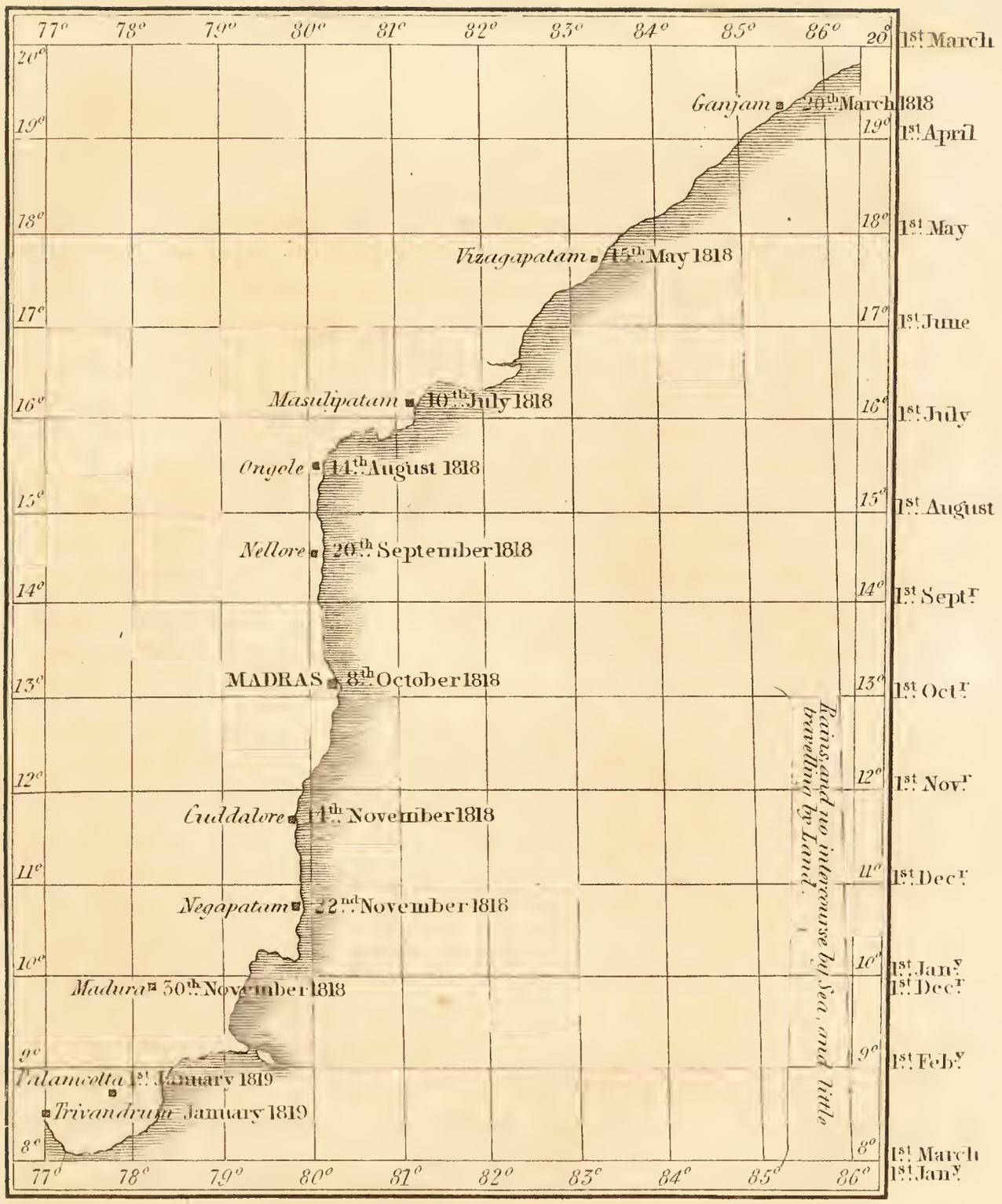
We conclude then that from the limited number in any given community, who are affected with this cholera, there cannot be inferred a material difference between this and the well known contagious diseases. In regard to all of them we find that they are resisted by some persons, the proportion varying in the different species of those diseases. The most that can be said as to cholera, on this score, is that it finds fewer persons, in most communities, prepared to receive it than most contagious disease do. Meanwhile it is very possible that the contagion produces a mild disease, which is not recognised for want of specific characters. Diseases are certainly to be described by symptoms; but when we refer to their causes and even specific causes, we must acknowledge that the diseases produced by the same specific cause may present a variety in the symptoms, as respects their kind and their severity.

The arguments in favor of the doctrine that the cholera is contagious have now been stated. Before attempting to draw a conclusion from them, we must bring forward those on the opposite side. This may be done more briefly, as many of the facts to be relied on have already been narrated in this report.*

By those who deny contagion it is maintained in general, that the spasmodic cholera has extended over the world like various other pestilential diseases, and in accordance with laws which are discovered even in more common and limited epidemics. It is proper then to adduce full and distinct proofs of contagion, before we attribute this property to a new epidemic. Such proofs, it would be said, have not been exhibited; for those which have been adduced may be regarded as showing coincidences only, such as might be found in every extensive epidemic.

From a desire to present the argument on this side fairly, the Committee have thought proper to introduce the following extract, though long, from the treatise on *Cholera Asphyxia*, by Mr G. H. Bell. The arguments might no doubt be stated

* See Appendix, D.


77° 78° 79° 80° 81° 82° 83° 84° 85° 86°
20° 19° 18° 17° 16° 15° 14° 13° 12° 11° 10° 9° 8°
1st March
1st April
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1st Octr
1st Novr
1st Decr
1st Jany
1st Feby
Ganjam 20th March 1818
Vizagapatam 15th May 1818
Masulipatam 10th July 1818
Ongole 14th August 1818
Nellore 20th September 1818
MADRAS 8th October 1818
Cuddalore 14th November 1818
Negapatam 22nd November 1818
Madura 30th November 1818
Palamcotta 1st January 1819
Trivandrum January 1819
Remained no interval by Sea, and little travelling by Land.

more briefly, and some things omitted, which are not necessary for our purpose. But we are unwilling to deprive our readers of the pleasure and advantage of Mr Bell's view of the subject, expressed in his own strong and spirited language.

'There is no question connected with the doctrine of diseases of more importance, than that of the contagious or noncontagious nature of a dangerous malady. In a particular manner is this true in regard to a disease like cholera asphyxia, one attack of which, so far from being a protection against a second, seems to render the constitution more susceptible of the disease. Were it therefore ascertained, that contagion is the cause of the spreading of cholera, measures might be taken for arresting its progress, and we might have some hope of staying one of the most formidable scourges which has ever afflicted mankind. Hence there is every reason for endeavoring to ascertain the fact, with a view to the prevention of the disease. But I confess it is with no such hope that I enter on this inquiry.

'My own opinion, not hastily adopted, is, that cholera has not, within the tropics, proved itself contagious or infectious; and I trust, that in traversing Europe, as there is reason to dread it is now about to do, this pestilence will not be found to have so far changed its nature as to render our intertropical experience on this head useless. That experience appears, I think, to justify me in saying, that the question truly is, whether we shall maintain a speculative controversy, one effect of which must be to make pest-houses of our hospitals and of the dwellings of the sick, or be guided by the result of experience, and thus be enabled to secure to those suffering under this frightful disease, the sick-bed attentions of their friends, or the assistance of hospital attendants, unrestrained by the paralysing effects of personal fear for their own lives.

'The following enumeration embraces the points of chief importance in this deeply interesting inquiry.

'1. The nature of the disease.

'2. The march, as it may be called, or progress of this disease on the great field of its ravages.

'3. Its progress in particular districts.

'4. The manner in which it prevailed in a camp or city.

'5. Its appearance in a sporadic form.

'6. Whether those cases which have been considered the consequence of contagion, may not be otherwise accounted for? And,

'7. Whether there is conclusive evidence, (so far as negative evidence can be so), that the disease is *not* contagious?

'1. The subject of contagion, applying the term to that power by which a disease is enabled to propagate itself, is one of pe-

culiar delicacy. For, in addition to its importance, in a medical point of view, it is a question in which the prejudices, fears, and safety of the inhabitants of every civilized country, are concerned. The nature of this work does not admit of the general doctrine of contagion being fully discussed. It appears necessary, however, to say a few words on this subject.

'It is unquestionable that many diseases are of a nature to extend themselves by contagion, in the sense to which it is here employed. But even the most decidedly contagious affection seems to require, towards its propagation, the aid of agents over which it has itself no control. Thus there must not only be predisposed subjects, but, there seems to be requisite a particular condition of season or climate, to invest a contagious malady with full activity. This single fact is one of the chief causes of the difficulty of reasoning on this subject; for the suspension of a disease may not be owing to its noncontagious nature, but to the absence of a soil on which it may germinate.

'The diseases which seem best entitled to be considered contagious, are eruptive fevers — fevers having a putrid tendency, and those attended by cynache. Ophthalmic affections seem also sometimes to become contagious; and many cutaneous complaints are capable of being communicated from one individual to another. Hydrophobia is the only affection, having its seat in the nervous system, which is capable of propagating itself; but that only by inoculation. Those poisons which can be introduced by the same means, to the injury of the system, are not to be regarded as productive of disease.

'It appears to be a law of contagion, that the infection shall not immediately manifest itself; and it is, therefore, generally some days after exposure to contagion, before the disease becomes apparent.

'We have seen that cholera assumes the character of a nervous failure, and that it attacks those predisposed to it, immediately on their coming within the influence of its remote cause; that its symptoms are like those produced by certain poisons; and that recovery from it is as instantaneous as the restoration of the sensorial powers after suspended animation. It has not therefore, in its mode of attack, in its course, or in its termination, any of the characters of those diseases which experience enables us to call contagious.

'2. The disease extended itself over countries differing entirely from each other in climate and position; having no regard to seasons. This, at first sight, may appear to support the opinion, that the disease is contagious or infectious. And such would be the legitimate conclusion, had cholera advanced more rapidly on great thoroughfares, or on the sea-coast, where unrestricted intercourse prevailed, than in the interior of the country, and where

little or no communication existed. But, instead of having been thus propelled in one direction, and retarded in another, we find the disease travelling with an equal pace over the whole surface of India, extending, on its way south, over eight or ten degrees of longitude, and reaching the least frequented spots and most secluded villages.

'It may be said, that we are not to expect that a disease, which, like cholera, at once arrests the wayfaring traveller, is to pursue its course rapidly on land. But this objection to my argument will not hold on a sea-coast, where small trading vessels carry on uninterrupted traffic, for a great portion of the year, and where no quarantine laws exist. In such circumstances, a contagious disease would inevitably be speedily propagated along the sea-shores. And hence, instead of cholera reaching the seaport of Madras, simultaneously with its appearance in parallel latitudes in the interior, some of the many trading vessels must have carried it speedily, from the tainted districts, to the seat of the Presidency, had the disease been capable of being conveyed by man or merchandize. The progress of cholera down the peninsula of India, when it visited that country in 1818, is so instructive, that I have thought it advisable to abridge the map published by Mr Scott in his Report, already referred to. From this sketch it will be perceived, that cholera, as an epidemic, was in 19° N. on the 10th March, 1818, that it travelled regularly at the rate of about one degree of latitude a month, and that it reached Madras on the 8th October in 13° N. This was its progress during the dry season, and when there was no interference with the constant commercial intercourse which prevails on the Coromandel Coast. On the 10th of October, annually, the port of Madras is closed, and in consequence of the prevailing winds, and of the surf, which, during the next two months, breaks upon the whole of that open coast, every vessel is forced to leave it, and the small trading vessels are drawn high and dry on land. By referring to the annexed map it will be seen, that far from this interruption to communication, retarding the progress of this extraordinary disease, it passed over the next five degrees of latitude, even more rapidly than over the former six; for we find it at Cape Comorin by the 1st of January, and it travelled in little more than a month to Negapatam, nearly three degrees north of Madras, during the height of the rainy season. This mode of progression can scarcely, I think, be explained on the principles of contagion.

'3. It is known to every one who has had experience of cholera asphyxia, and it is proved by every work on the subject, that its course through individual districts was peculiarly eccentric:— That often, instead of advancing directly to populous places, when prevailing on the principal road leading to them, it would "take a complete circuit round the village, and, leaving it un-

touched, pass on, as if it were about wholly to depart from the district; then, after a lapse of weeks, or even months, it would suddenly return, and, scarcely reappearing in the parts which had already undergone its ravages, would nearly depopulate the spot that had so lately congratulated itself on its escape."* Or it would sometimes nearly depopulate small villages near a principal station, before it made its appearance there. Thus, during a period of upwards of five years, (from 1819 to 1824), in which I had medical charge of the civil and political establishment in the southern Mahratta provinces, and was, for a great part of the time, in medical charge of the garrison of Dharwar, cholera, in an epidemic form, appeared yearly in that division, in the months of April, May and June; and it only broke out at Dharwar, the principal civil station, in the years 1820 and 1821. In the latter of these years it had, as stated in my official report, "prevailed for the last two weeks in several surrounding villages of from six to twelve miles distance, and has in some of them swept off many of the inhabitants;" being thus for many days within sight of the capital of the district, before it reached it. In 1824, although the disease again prevailed in the immediate neighborhood, it did not appear in the town or jail of Dharwar.

'These examples of the habits of the disease appear to me inconsistent with the notion of its being possessed of a contagious quality. For in a country where, as in India, no restrictive measures are adopted, a principal city in a district could hardly by possibility escape a contagious epidemic, when raging in its neighborhood. An infectious disease, one attack of which affords no protection against another, which travels in the face of the wind, and prevails in all seasons, would spread in every direction from any point at which it had commenced its ravages; and we should not expect it to disappear until it had attacked every individual liable to suffer from it, and exposed to its pestilential influence.

'The course pursued by the cholera on its appearance in Russia, does not appear to have differed very much from its progress in India. It did not reach the imperial territories when it was known to prevail on the great roads leading to Orenburg, where it at last broke out. And when it did commence its ravages at that place, there seems to be no reason to believe that it prevailed within reach. It does not appear to have spread directly; nor, although its general course was northwest, does it seem to have held that course undeviatingly; but at one time it capriciously passed over fifty or sixty miles, and then retrograded on the country which had thus appeared to have escaped; at other times, certain places appeared happily to be exempt, but, five or six

* Bombay Report, p. 6.

weeks after it had left the country, it broke out anew in those very places which had had reason to congratulate themselves on their escape.*

'4. The annals of cholera prove, that when it made its appearance in a camp or a city, far from extending to every habitation, it was almost invariably confined to particular portions of even the most populous places. Sometimes, in an army for instance, one or two regiments encamped together, or separated by other corps, were the only sufferers in an attack of the epidemic; one division, or even one street only of a town, had the disease existing in it; nay, its prevalence has been known to be limited to one side of a market-place. Removing a camp a few miles has frequently put an entire and immediate stop to the occurrence of new cases; and when the disease prevailed destructively in a village, the natives often got rid of it by deserting their houses for a time, though in doing so they necessarily exposed themselves to many discomforts, which, cæteris paribus, we should be inclined to consider exciting causes of an infectious or contagious epidemic. The bare statement of these facts affords a strong argument against the doctrine of contagion or infection, as a source of cholera asphyxia.

'5. It is possible that, under peculiar circumstances, a sporadic case of a contagious disease might occur without the disease spreading; but we could scarcely hope that such immunity would be of frequent occurrence, where no steps were taken to prevent such an event. Yet it is well known that insulated cases of cholera are of constant occurrence in India, and that it is not uncommon for several individuals to be simultaneously attacked, in a particular quarter of a city or camp, without any subsequent spreading of the disease.

'It is absurd to endeavor to draw a line of distinction between a *sporadic* and an *epidemic* case of cholera; the disease is the same in symptoms, the same in its course, and the same in its results. No doubt this argument presents a difficulty, to whatever we ascribe the disease; for it may be said that the want of predisposed subjects prevents its dispersion. But we have a sufficient cause to produce one or more cases, and why trammel ourselves with an inconvenient, and to the sick most injurious, probability, when there are so many facts in direct opposition to it?

'6. It is no proof that a disease is contagious, to say that all the inhabitants in one house have suffered from it; or that it has attacked the attendants of the sick. This is a disease running so rapid a course, and which, on its accession, so immediately deprives those affected with it of the power of locomotion, that it

* *Vide* Edinburgh Medical and Surgical Journal, No. CVII.

cannot be carried by individuals to any great distance: it suddenly appears in a particular part of a city or camp, attacking several individuals within a few hours of each other, while it does not exist anywhere else in the neighborhood. We must suppose that the remote cause, whatever that may be, prevails at the particular spot thus affected. And moreover, it is to be taken into account, that, in a house in which a father, son or mother, is carried off by so rapidly fatal a disease, there will be much distress of mind and fatigue of body to every member of the family. Here then, in one house, not only is there the remote cause of cholera, but undoubted predisposing causes, superadded, perhaps, to a family constitutional tendency to suffer from the disease. Under such circumstances, surely, we have sufficient to account for more than one of a family falling victims to the cholera, without calling in the agency of a problematical cause for its extending itself to various members of the household.

'It is supposed that medical men have suffered more than others of their rank from cholera. We should certainly expect this to be the fact, for whatever may be the remote cause of the disease, it is admitted by all, that fatigue of mind and body is a powerfully *predisposing cause*. So that instead of receiving the preponderance of fatal cases (if such be the fact) of this disease among medical men, as a proof of its contagious nature, the very few deaths from cholera among the professional men who have seen much of the disease, ought to be regarded as evidence on the other side. I am persuaded, indeed, that the almost universal belief of Indian practitioners that the disease is *not* contagious, results from a conviction, which every medical man, who has done his duty to cholera patients, must feel, that had the disease been communicable from one individual to another, he could scarcely by possibility have escaped.

'In my apprehension, indeed, the wonder rather is, that so few of the medical officers belonging to the Madras Presidency have died of cholera.* Much, I think may be ascribed to cholera

* 'During the years from 1818 to 1822 inclusive, the numerical strength of the European troops in the Madras Presidency was kept up at 10,000 men. In the course of those five years 3,664 cases of cholera occurred in this force, of which 695 were fatal, or at the rate, per annum, of one casualty from cholera to every 72 men. During the same period, the Madras medical establishment was kept up at 200 commissioned officers. In those five years, 33 medical officers were known to have had attacks of cholera, of whom 13 died, that is, one in 77 per annum. — See Madras Report.

'Of course, under ordinary circumstances, the risks run by officers should not be brought into comparison with the dangerous exposure to the predisposing causes of an epidemic disease, arising from the habits of European soldiers in India. But medical men have more than their own share of exposure to the remote cause of cholera. For, to say nothing of the effects of the fatigue and anxiety to which they are exposed during the presence of the disease, among those immediately under their charge, they are liable to be detached whenever the disease breaks out within reach of them.

patients having been, almost invariably, brought into hospitals, frequently at a distance from their own habitations; and we have seen that the remote cause of the disease is always, for the time being, limited to particular localities. Hence it has been found, that, notwithstanding the severest duties to the surgeons and their assistants, regular and extra, the most crowded hospitals, where situated beyond the territorial range of the disease, have not afforded a single new case. This point will be fully illustrated under the next head.

'The legitimate conclusion seems to be, that cholera has not been influenced in its progress by contagion; having, on the contrary, been frequently confined to one portion or quarter of a populous camp or city, although no means were taken to prevent its extending over the whole dense population of either: That it has appeared sporadically without spreading: And that it is possible to account for its being destructive in one particular house or quarter, without the aid of contagion.

'But it has been said to accompany troops, in marching into a district where it had not previously prevailed, and into which it has thus been introduced. This statement is so much at variance with the well ascertained habits of the disease, that it would require the most minute inquiry, and unquestionable evidence, to entitle it to credit. It has been repeatedly ascertained, that cholera patients may be carried into hospitals crowded with patients laboring under other diseases, without these, or numerous hospital attendants, having the disease communicated to them. Yet it is asserted, that a regiment, travelling at the rate of six or ten miles a day, has carried the disease along with it a hundred miles or more, communicating it to the inhabitants as it passed on! We have seen that a camp, by shifting ground a short distance, has put a stop to the ravages of the disease. And is it to be believed, that a regiment cannot get rid of it, with no cause but contagion for its continuance, by ten or twenty marches? I conceive, that this supposed proof of a contagious quality in cholera may be otherwise accounted for. When travelling on circuit, I have found the disease prevailing in a district, before any report had been made of the fact, notwithstanding the most positive orders on the subject; and I am persuaded, that were any of the instances, adduced in support of the statement under consideration, strictly inquired into, it would be found, that the usual apathy of the natives of India had prevented their noticing the existence of the disease, until the fact was brought prominently forward by the presence of Europeans. It should also be borne in mind, that cholera asphyxia is not a new disease to these natives, but seems to be in many places almost endemical; whilst it is well known, that strangers, in such circumstances, become more obnoxious to the disease than the inhabitants of the coun-

try. Moreover, travellers have, superadded to the remote causes of the disease, fatigue and road discomforts, which are not trifling in a country where there are neither inns nor carriages.

'The following extract from the journal of my first journey in India, is illustrative of some of the peculiarities, in this disease, to which I have adverted. In July, 1819, I marched from Madras in medical charge of a large party of young officers, who had just arrived in India, and who were on their way to join regiments in the interior of the country. There was also a detachment of Sepoys, and the usual numerous attendants and camp followers of such a party in India. The cholera prevailed at Madras when we left it. Until the fifth day's march, (50 miles from Madras), no cases of the disease occurred. On that day several of the party were attacked on the line of march; and, during the next three stages, we continued to have additional cases. Cholera prevailed in the country through which we were passing. In consultation with the commanding officer of the detachment, it was determined that we should endeavor to leave the disease behind us; and as we were informed that the country beyond the Ghauts was free of it, we marched without a halt, until we reached the high table land of Mysore. The consequence was, that we left the disease at Vellore, 87 miles from Madras, and we had none of it until we had marched 70 miles farther, (seven stages), when we again found it at one of our appointed places of encampment. But our camp was, in consequence, pushed on a few miles, and only one case, a fatal one, occurred in the detachment. The man was attacked on the line of march. We again left the disease, and were free from it during the next 115 miles of travelling. We then had it during three stages, and found many villages deserted. We once more left it, and reached our journey's end, 260 miles farther, without again meeting it. Thus, in a journey of 560 miles, this detachment was exposed to, and left the disease behind it, four different times; and on none of these occasions did a single case occur beyond the tainted spots.

'7. It has been remarked by many practitioners, that although they had brought cholera patients into crowded wards of hospitals, no case of the disease occurred among the sick previously in hospital, or among the hospital attendants. My own experience enables me fully to confirm this. The military hospital at Dharwar, an oblong apartment of about 90 feet by 20, was within the fort, and the lines of the garrison were about a mile distant, outside of the walls of the fort. On two different occasions, (in 1820 and 1821), when the disease prevailed epidemically among the troops of that station, while I was in medical charge of the garrison, but while no cases had occurred in the fort within which the hospital was situated, the patients were brought at

once from their quarters to the hospital, which on each occasion was crowded with sick laboring under other disorders. No attempt was made to separate the cholera patients from the others. On one of these occasions, no case of cholera occurred within the hospital; on the other, one of the sick was attacked, but he was a convalescent Sepoy who had not been prevented from leaving the fort during the day. The disease on each of those occasions was confined to a particular subdivision of the lines, and none of those residing within the fort were attacked.

'Here then there were from 20 to 30 cases of cholera admitted, in the course of a few days, into the same apartment with from 40 to 50 patients suffering from other ailments, yet not a single instance, to countenance the notion of contagion, occurred.

'Mr Scott says, "The most striking instances of immunity from the disease, under the most intimate personal intercourse, will be found recorded in the original reports. In the hospital of the Royal Regiment, only one individual out of one hundred and one attendants was attacked with the disease. In that of the 11th Native Regiment at Vizianagram, as recited by Mr M'Andrew, p. 33, not one was seized, although their numbers would seem to have been great. In the hospitals at Trichinopoly no attendants were taken ill. Many medical officers appear to have slept in their hospitals, without suffering any bad consequences. At St Thomas' Mount, where a general receiving hospital for patients with the cholera was established, and where the numerous attendants were people not at all accustomed to hospitals, not one of them was taken ill; yet it was not uncommon to see them using the bed clothes of patients who had just recovered or died. The same observation applies to the numerous receiving hospitals at Madras. Mr Acting-surgeon Gibson, on reporting on a late attack (April, 1823), experienced by the 69th Regiment at Wallajahbad, observes, I had 92 admissions, and increased the establishment of servants to double: I lived in the hospital, amidst the sick, day and night; and yet neither I myself nor any of the servants got the disease; but the hospital sergeant's wife, living in a retired room, not near any disease, had a severe attack."*

'In Russia, under equally favorable circumstances, hospitals seem to have enjoyed a similar immunity; thus, "as is mentioned by a staff physician, Dr Smirnov, during two months while the disease prevailed at Orenburg, and 299 patients were admitted with cholera into the military hospital, the personal attendants on the sick remained entirely exempt from the disease. They consisted of one hospital assistant, six pupils, as many

* Madras Report, p. 50.

Baschkir lads, and fourteen hospital servants, — in all 27 ; and their duties were to perform blood-lettings, apply leeches, poultices, and frictions, and administer baths and the like, so that they were compelled to be constantly breathing the exhalations from the bodies and clothes of the sick, as well as to touch and handle them. Beside, the same immunity was enjoyed by certain officers and subalterns who lived in this hospital, and were in the sick wards once a day, besides being at other times in constant communication with the hospital assistant and the pupils. Farther, the washerwomen of the hospital likewise escaped, — a class of individuals, who, it is well known, are extremely apt to suffer from contagious diseases. One only was attacked with cholera ; but she washed only the clothes of the officers, none of whom had been affected before she took ill. Lastly, Dr Smirnov, and his colleague Dr Sokolov, were in constant attendance on the patients affected with cholera, but did not suffer."*

'Even supposing, therefore, that an attack of cholera asphyxia might, in some instances, be accounted for on the doctrine of contagion, there are so many other occasions in which it is evident that no such quality of the disease can have existed, that the theory of contagion is only to be supported by admitting controvertible facts, and at best rare and otherwise explicable exceptions, in opposition to the ordinary phenomena of the disease ; and also in opposition to the unanimous impression of those medical men in India, who have been most familiar with the disease.

'There is one point on which a few words are required before concluding this portion of the treatise. Every hospital surgeon is aware, how seriously important it is to himself, and how vital a matter it is to the sick, that the subordinate hospital attendants should not only be efficient, but willing to perform their duties. A high-minded gentleman, notwithstanding a belief in contagion, may boldly do his duty to a patient laboring under a pestilential malady. But we are not to expect the same devotion, under similar circumstances, from an ignorant nurse or half-educated dresser. It requires much more nerve than persons of that class usually possess, to enable them to brave death in such a shape, from a sense of duty : And to those who, like the author, have suffered from the effects, on hospital servants, of the mere mooting of the point, it becomes a question, whether, for all practical purposes, it were not better at once to drop the subject, than by countenancing the belief, while so questionable, to inflict a fatal injury on the unhappy sufferers ; unless, indeed, it shall be ascertained beyond a doubt, that the progress of the disease may be stayed by sanitary cordons and quarantine restrictions.

* Edinburgh Medical and Surgical Journal, vol. xxxvi, p. 132.

'I have as yet restricted myself to the discussion of the question of contagion in its professional bearings. But the subject has assumed an importance to every government in Europe, which renders it imperative on the author of such a treatise as this, to say a few words on quarantine restrictions and sanitary cordons.

'The disease is evidently one which does not lurk in the constitution. Its cause, like the venom of a viper, or a narcotic poison, produces immediate effects. Thus, a man lands from a sea voyage at a port where the cholera exists, is attacked with the disease, and, before he has been twelve hours exposed to its cause, has fallen a victim to it: Or, as has been stated before, a traveller on a journey passes over a spot of ground on which the *cause* of the disease prevails; he falls down, as if exposed to the pestilential influence of the fabled Upas tree, and, if carried to the end of his stage, is found to be beyond the reach of art. The disease, therefore, is one which loses no time in manifesting itself; so that, even if admitted to be contagious, a very short quarantine would suffice, and commercial, social, and political intercourse, would suffer but little inconvenience.

'I have said nothing of quarantine on goods, because I have never heard or known of any evidence to prove that the disease can be so conveyed. When washerwomen wash with safety the clothes of cholera patients, and servants lie down with impunity in the beds which have just been cleared of the dead bodies, or use the bed clothes of those who have died, we shall scarcely have reason to fear the introduction of the disease into a country by tallow, hemp, or ox hides.

'A restrictive cordon assumes a different character. The effects to the sick, of a dread of contagion on the minds of their attendants, has been already hinted at. But its staunchest supporter admits, that contagion is but one of the causes of cholera; while it must be evident to every one, that the remote cause of the disease pervades a portion of country, where it prevails for a time, and that all living, or coming within the bounds thus, for the time, marked out by the disease, are apt to be attacked. In a country free from sanitary restrictions, we have seen the inhabitants of infected spots find safety in flight. How different would their condition have been, had they been strictly hemmed in within the tainted limits. There cannot be conceived a situation more full of horror than a town, the site of which is infected with cholera, and the inhabitants shut up in it.

'The tendency, therefore, of admitting at once the existence of contagion in cholera, in the present undecided state of the question, is injurious to trade, fatal to the sick, and fraught with melancholy forebodings to those who may be exposed to a visitation of the disease.'—pp. 76 – 97.

To the foregoing, some facts and considerations are to be added.

1. It has been noticed, that in some instances those who have secluded themselves while the disease prevailed around them, have not been affected by the cholera. The exemption in such cases has been attributed to the non-intercourse with the sick. But it appears that some places have enjoyed an equal exemption notwithstanding a free intercourse with those who were suffering from the disease. Mr Bell refers to such cases in India. An instance of this kind is related by Mr Annesley.

'Cholera attacked the field force stationed at Malligaum in Kandiesh, and raged with great violence among the corps posted on the left of the line; while the 17th battalion of native infantry, who were posted on the right of the line, were exempt from it, notwithstanding they had continued communication with the other men. But, although they were exempt from the disease while they remained in this position, they suffered very much from cholera on their march from Malligaum to join Major General Sir John Doveton's force in the Ellichapoor Valley.'*

We have already quoted a striking case of the same sort, in a letter from John Booker, Esq. at Cronstadt. See page 67. Other instances which might be placed under this head are introduced, connected with other subjects, in different parts of this report.

2. The prevalence of the spasmodic cholera, in its unequivocal form, such as has of late been called in England the *blue cholera*, has been preceded in many places by milder diseases somewhat similar to it. These have been considered as showing some extensive atmospherical cause, capable of producing diseases of the alimentary canal. Instances of this kind were noticed in India in the first years of the epidemic. In different parts of Russia these premonitory affections were observed. The following is a translation from a work by Dr Jaehnichen, of Moscow, published in 1831. 'The invasion of Moscow and other places in Russia by the cholera was preceded by a peculiar disposition to diarrhœa and vomiting, in short, to what have been called gastric affections. This has continued during the whole course of the disease, and continues at the present time. This appears to show a peculiar epidemic constitution of the atmosphere.'†

* Annesley's Sketches of the Diseases of India, pp. 242--243.

† This was written after the spasmodic cholera had disappeared, or nearly disappeared, at Moscow.

The following letter goes to show a similar state of things at Sunderland before the occurrence of the spasmodic cholera there. No apology will be necessary for introducing the whole letter, though a part of it does not relate to the point now under consideration.

'Dr Brown, of Sunderland, to Dr James Johnson, and Dr Alexander Tweedie, Physician to the London Fever Hospital.

Sunderland, Nov. 10, 1831.

'Gentlemen — The first question asked here, and which probably may be put in London, is, "Is this the continental disease?" The question is an ambiguous one, and ought not to receive a direct answer; for it may mean any one of these three things, viz. — 1st. Do its symptoms correspond with those of the continental disease? 2d. Has it been imported from the continent? 3d. Does it, in its diffusion, obey the same laws as the continental disease? In the first sense of the question, I would answer it in the affirmative; in the second, *decidedly in the negative;* whilst, in the third, my answer would be doubtful, for the laws which the continental disease obey, in its diffusion, are not as yet fully ascertained.

'Need I examine formally the question of its importation, and refute the story circulated through the newspapers of certain ships which lay above our bridge, and communicated the disease to the town? Those ships came from places where cholera did not exist at the time of their departure — most of them from Holland, where it has not yet appeared — their crews were, and had been, in perfect health; and the disease *first* manifested itself in a part of the town *two miles distant from where they were lying.* If there have been other modes in which disease may have been communicated from the continent, I know not of them. One man, a pilot, was attacked some time ago; he had been on board a vessel, which had recently come in ballast from performing quarantine; but at the same time, cases identical in character were taking place in individuals, who had had no communication with shipping; and assuredly a ship with a healthy crew, in ballast, and which had performed the regulated quarantine, was not a probable source of the disease with which this man was attacked, and under which he succumbed.

'The importation doctrine is here — where we must be supposed to be the most competent judges of a matter not of opinion but of fact — so generally abandoned, that I shall bestow no more pains on its refutation; but proceed to give as concise a sketch as I am able, of what we may designate by the antiquated term, the medical constitution of the latter part of the present year, and endeavor to show by what insensible gradations our

autumnal disease has passed into the intense form which has produced such lamentable consternation throughout the empire.

'Early in the month of *August*, cholera appeared and speedily became very prevalent. It ranged in all degrees of intensity, from slight bilious attacks, to cases attended with violent spasm, coldness, collapse, almost, (if not complete) arrest of the circulation, *white discharges, suppression of urine, and, in short, all the symptoms ascribed by observers to the Asiatic and continental diseases.* Of these more intense cases, several were fatal, some of them within *twelve hours;* whilst others narrowly escaped by prompt and skilful medical assistance. Such cases occurred in situations remote from each other ; some of them several miles *inland* — one, for instance, and that a fatal one, in a female living in the village of Boldon, five miles in the interior, and remote from the river. Others of the agricultural population suffered in various situations ; some certainly near the river, but there were no ships in it at the time, which had come from suspected places.

'On the abatement of the heat, cholera became less general ; but did not totally cease, cases continuing to recur at intervals, some fatal, others of great intensity, but terminating favorably ; whilst the prevailing gastric and intestinal constitution was marked by the frequent occurrence of cases of fever, commencing with vomiting and purging of matters variously colored — in short, by symptoms of cholera ; and this state of things continued till the almost simultaneous occurrence of four deaths from cholera, on the 31st ult. and 1st inst., excited general alarm. For what has subsequently occurred, the reports to the board of health must be referred to.

'Whilst matters are thus proceeding in Sunderland and its immediate vicinity, information I have received from various quarters, and through various channels, leaves no doubt on my mind, that a similar train of events has been in progress generally throughout the northeastern division of the kingdom — the same prevalence of fever, of which the initiatory stage is marked by vomiting and purging — the same occurrence of fatal cases of cholera, since the season of heat and fruit has passed ; but, so far as I know, the same prevalence of the intense forms of the disease has not been manifested elsewhere as here ; yet this difference in degree does not, I imagine, make our state *essentially* different. What is our fate today may be that of others tomorrow. A fortnight ago we were no worse than our neighbors.

'In this sketch of the general progress of disease, during the autumn, I have classed together things which, because differing in name, are by many supposed to be *essentially* different — cholera and fever. The relation between these two genera of disease, is as close as possible. If a man is attacked with vom-

iting, purging, and collapse, and succumbs to these symptoms, he is said to die of cholera ; if the disorder of the system is eliminated, as it were, by the discharges from the intestinal canal, he is said to recover from it ; but if neither of these events occur, his state becomes one of fever, not distinguishable from that affection unpreceded by choleric symptoms. The first case which Dr Daun saw, on his arrival here, he said he could not distinguish from typhus — the discharges had ceased, and it had passed into the febrile state. I pointed out this relation between ordinary cholera and fever in the essays published three years ago, and was not a little surprised to see my observation quoted in the *Courier* newspaper of the 7th inst. Am I then to regard the disorder I now witness here, as something not resulting from indigenous causes — as in no way connected with the progression of disease I have remarked — but as suddenly thrown in and totally foreign from that to which, notwithstanding, it bears so striking a resemblance ? I own I cannot so far shut my eyes to facts, or fail to exert my reason in drawing legitimate inferences from them. If I now visit the houses of the opulent and comfortable, I find, as heretofore, bilious attacks easily allayed, or febrile disorder connected with them ; — in the hovels of the indigent, I find a disease characterized by the symptoms of the epidemic cholera of the continent, so far as I can judge of them by the reports of others. The rational inference from this appears to be, that both result from the same epidemic influence modified in its operation by the different circumstances in which the two classes of persons are placed.

' In thus stating my belief, that this disease is but the effect of a general epidemic influence, I wish it to be distinctly understood, that I have seen nothing in its progress that has led me to conclude that contagion is instrumental in its diffusion. One or two *primâ facie* cases of infection have presented themselves ; but a little scrutiny has shown me their fallacy. This branch of my subject, if it appear necessary, I will resume at a future opportunity.

' It must be evident from the opinion just expressed, and the general tenor of my communication, that I should deem all restrictive measures on internal commerce as useless in a preventive point of view, as they have already proved on the continent, whilst, on many grounds, their impolicy is obvious.

I remain, my dear Sirs,

Your very obedient servant,

J. BROWN, M. D.'*

From the anxiety which existed in Great Britain during the last year in regard to the cholera, every appearance of disease

* Johnson's Medico-Chirurgical Review for Jan. 1831, pp. 301 -- 303.

in the stomach and bowels was noticed with peculiar care. No doubt much was observed and published, which at common times would pass without notice. But after all allowances on this account, it does appear from various respectable sources, that not only the slighter gastric affections, but even cases of severe spasmodic cholera, were unusually frequent during the last summer and autumn throughout a great part of that island.

Although these facts are of very considerable weight on the side of the non-contagious nature of the cholera, yet they cannot be regarded as conclusive. At least they would be much more so, if the disease had appeared in its severe and unequivocal characters, first in the interior of the island, or simultaneously in various parts of the country, instead of making its entrance at a seaport, very conveniently situated for its introduction from the continent. Likewise, if we are to regard the milder disease in Russia and elsewhere as differing only in degree from the more severe epidemic, the problem still remains for solution, why this pursued the regular course it did from Bengal to the other parts of the world. Again, by the foregoing statement the epidemic constitution existed in August and September in England; and by Sydenham's just account, the cholera belonged to these seasons as truly as the appearance of the swallows to the spring season. Why then did not the severe cholera appear in England, as well as in Austria, in the month of September. In making these observations, the Committee have in view only to bring fairly before the public all the considerations on which a judgment should be formed.

3. The history of the cholera in Asia and Europe shows that it has rarely affected more than one tenth, and often only two or three in a hundred, of the persons exposed to it; that is, of the inhabitants of the towns and cities where it has prevailed. Likewise, that it has suddenly ceased to prevail after a few weeks, and occasionally after a few days only. Now it is urged that we ought not to suppose that the disease would cease in this manner, and affect so few persons, if it were contagious. For this would show that a larger number of persons are destitute of a susceptibility of the contagion than can reasonably be believed.

4. The following extract is from the Edinburgh Medical and Surgical Journal for July, 1831. The facts are derived from the Russian official reports. The whole, facts and arguments, are quoted, as presenting a very fair statement from a very respectable source. To do justice to the candor of the re-

viewer, it should be noted that his opinion leaned to the side of contagion.

'With respect to the interesting occurrence at Razüpna, where several of the garrison took ill four days after the death of a man who was seized immediately on his arrival from Orenburg, it is distinctly mentioned in one of the reports by Dr Schumov, that, of the individuals who visited this person, not one was attacked; that of those who were attacked not one had been exposed to the contagion supposed to have been introduced by him; and that its extension in the garrison was not prevented by an early and rigorous quarantine.

'Next, as to the irregularity of the course pursued by the disease, — while this is at variance with the idea of an atmospheric cause, it is equally true that some facts relative to its course are not easily reconcileable with the notion of contagion being its only cause. We have seen, for example, that at Tschernoretschinsk, the disease appeared on the 19th of January, after having passed over this place four months before in its course westward. But it is also particularly worthy of notice, that in all the towns and villages within a moderate distance, but one, the disease had completely disappeared before the end of November, and that in the only village where it continued longer, Cardailovka, at a distance of twenty miles, it had ceased on the 8th December, or more than five weeks previously. Now all the facts hitherto collected in favor of the contagious nature of cholera show, that, if contagious at all, the period during which the contagion remains latent in the body is very short. So strongly indeed was this shown to be the case, that the Russian government, as already mentioned, limited the quarantine to fourteen days for the person. In all the cases where the disease broke out soon after the sickening of a person newly arrived from a diseased district, it appeared among the residenters in less than a week. If the contagion, which, in the majority of instances remained latent in the body four or five days only, could in some instances have remained latent for five or six weeks, the disorder, as the quarantine for persons was limited to fourteen days, ought to have extended itself over a much greater extent of country, and travelled with far greater rapidity. It is not easy then to conceive how the village of Tschernoretschinsk could have received the disease by communication from infected individuals; neither is it stated that any such communication was actually traced; and as to communication by infected goods, it does not appear that the commencement of the disease in any part of the Orenburg government was supposed to have been referrible to such a cause.

'The last argument in favor of contagion, — the immunity

enjoyed by certain small districts in the heart of an infected country, whenever intercourse was cut off with the places where the disease prevailed, — is certainly a fact of much interest and some weight. At the same time so many instances of similar immunity occurred where the fact of free exposure to the supposed contagion could not be called in question; and so many instances also occurred where the disease spread in defiance of the quarantine, that one is tempted to ascribe the escape of the shut up districts, which, after all, were very few in number, to accident, or at least to some other cause than the suspension of human intercourse.

The following is from a letter by Dr Gibbs, first surgeon of the naval hospital, St Petersburg.

'A patient of mine at the naval hospital, of a cachectic and scorbutic habit, (who a month ago was at death's door with a gangrenous ulcer of the leg,) and was in a convalescent state, was attacked with vomiting, purging, and cramp, early on the morning of the 26th ult. Notwithstanding the ready assistance that was afforded, he expired on the fourth day. From the great precaution used in avoiding communication, this man, who was confined to bed in the hospital, must have been affected, I think, by predisposition idiopathically; for he is the only instance of the kind I have had under my care in hospital, every one of my patients having escaped. As he lay in the ward at the time, and was attended by those of the ward, we might look for contagion to spread did it exist; but, thank God, all are well.'*

5. In some instances, it is mentioned that the bearers of those who have died of cholera have become affected, without any communication before death. That this has been a coincidence only seems most highly probable, at least from other facts, viz. in India and in Europe, surgeons have carefully examined the bodies of those who have died of cholera, with a desire to ascertain its proximate cause. In no instance has there been reason to suppose that the disease has been conveyed in this way. Dr Jaehnichen and others of Moscow went through the examination, *post mortem*, of fifty subjects, without suffering.

6. In different places where the cholera has prevailed, diseases among brute animals have also been observed; and those diseases have been thought to be more or less similar in charac-

* Edinburgh Medical and Surgical Journal for Oct. 1831, p. 397.

ter to the cholera. Analogous remarks have often been made when severe epidemics have occurred in the human race.

These facts have generally been adduced as evidence that the cholera is not contagious. Perhaps they ought to be so regarded. But the question may be entertained, whether in such instances the disease may not pass from men to brutes, and again from brutes to men. If this can happen, or rather if it could be shown to have happened, it would solve many difficulties. As, however, there is no evidence on this point, the suggestion is made only for consideration. At present, the facts must be regarded as giving their weight on the negative side of the great question.

7. The following cases are introduced as instances of the occurrence of the cholera on board of ships.

In September, 1820, the H. C. ship Princess Amelia was lying at anchor in Whampau river, in China, in the middle of a large fleet of Company's ships, her crew in good health, when, without any warning, a young strong man was seized with symptoms of cholera, and was carried off in a few hours: the next day, two men died; the following day, two more. These were all young and previously healthy men, and their sudden deaths, and the peculiar and fearful symptoms accompanying, and even continuing after their dissolution, (viz. in some the muscles of the face, arms, and chest continued in action many hours after death,) produced among the rest of the crew a feeling of great dread: it continued carrying off two or three victims daily for eight days, when its violence as suddenly ceased, and all the cases afterwards were mild and tractable. In its mode of attack there was a good deal of variety: in some cases it began with violent pain about the umbilicus, weight on the præcordia, sometimes vomiting, often not; shortly after, cramps in the calves of the legs, fingers, or toes; sometimes a stiffness only of the muscles of the thighs or arms; after a time, the cramps ascended to the muscles of the abdomen, when the fæces and urine were ejected involuntarily; a sense of intense heat, and a fluttering pain at the pit of the stomach, shewed themselves; the muscles of respiration were generally last affected. In one or two muscular men, the progress of the cramp could be distinctly traced by the hard knots formed, as in the case of Mr Delvin. In some cases, faintness and excessive debility were the first symptoms, as in some of the cases on September 18th, when strong, healthy men, in a moment, felt their strength inadequate to support them, and fell down, their countenaces immediately suffering a frightful change: in some men, with whose appearance I was perfect-

ly familiar, the change was so great that I could not recognise them.

'The pulse varied much in the different cases: in some, it was gone at the wrist a few minutes after the attack; in others, it was only feeble and very quick, sometimes hard; at times, when there were violent cramps, soon terminating fatally, it was scarcely altered from a natural and healthy state. When bleeding was used, it sometimes sunk after a little blood had flowed, and never rallied; in others, it rose and became soft, such cases proving favorable.

'The violent cramps were always relieved by hard rubbing. In no case were the muscles of the face and neck affected.

'In every case that could be traced, a thin watery purging was a precursory symptom. The matters vomited never had any intermixture with bile. Flatulence sometimes was very distressing. The senses were clear, generally, to the last, unless when dozed by the opiates.

'In all the fatal cases, a very peculiar appearance of the fingers and hands showed itself: the skin appeared shrivelled and bleached, as if it had been long soaking in water. There was no case in which this showed itself that did not prove fatal.

'Much pains were taken to endeavor to discover a cause for this visitation of the cholera, but nothing satisfactory could be elucidated. There was only one other ship, among nearly thirty, that suffered as we did, and she was moored at some little distance from us. We discovered that in the town of Whampau, and in some of the neighboring villages, a disease, from description having some resemblance to cholera, was making dreadful ravages; and at the same time, on the borders of the province of Quang-Tong, the people employed to transport the tea across a chain of mountains separating the two provinces, were seized in great numbers, and their deaths were sudden. The season had been more than usually dry, and excessively hot.'

'In July, 1822, the H. C. ship Sir David Scott was lying at the new anchorage off Saugor Island, Bengal, where she had already been two months, and was preparing to proceed on her voyage to China, her crew in perfect health, when, on July 28th, a poor old man was seized with cholera. He had been ill for some hours before I was sent for, and, when I saw him, life was ebbing fast: there was no pulse, the body cold, and he was scarcely able to tell his complaints. Stimuli, external and internal, were used without effect; he died in ten hours from the attack.

'No more cases occurred that day; but next evening a fine young man was seized: he also died in ten hours. The next day another case occurred, which died in twelve hours. Next day, ten men were seized, of whom two died, eight recovered. The next day, thirteen fresh cases, of whom five (all young,

strong, and previously healthy men,) became the victims, after a few hours of suffering. The next day, eight fresh cases, of whom one died. Next day, four, two of whom died. After this a great many cases occurred, but much less severe, and none of them proved fatal.'*

The reader is to judge how far the foregoing cases prove the occurrence of cholera without contagion and without reference to its original source in India. Mr Grant states that in July, 1822, 'there was no cholera in Calcutta, nor anywhere in our neighborhood.' We had been led to believe that the spasmodic cholera had appeared in Calcutta every year since 1817. Indeed it is and always has been, frequently occurring in that city and in the low country of India generally. But we do not doubt, from Mr Grant's statement, that it was not noticed as prevalent in Calcutta at the time he mentions. Mr Grant does not tell us in either instance whether there had been any communication between the ships and the shores of the rivers in which they were lying.

8. The following testimonies should also be added, as operating against the doctrine of contagion.

'REPORT OF THE MEDICAL BOARD OF RIGA.

RIGA, MAY 14, (26).

'Agreeably to the orders of the high authorities of the Livonian Medical Board, it is made known to the Riga inhabitants, that after the appearance of a few sudden deaths and suspicious sicknesses had drawn the attention of the Medical Board, it now appears, beyond doubt, that the illness which has appeared in the city is the cholera morbus. By the most particular inquiries, it does not appear that this disease has been introduced from outwards into the city; and from the circumstances of the neighboring Governments of Courland, and the borders of the Duna, to the Minsk Government, remaining in a healthy state, as likewise that those who were first attacked, have not been strangers, but inhabitants, who lived in parts of the town distant from each other, and in the suburbs, would prove that the sickness has shown itself in this place from unknown causes in the air and surface of the earth, more particularly as the breaking out of the disease was at the commencement of unusually hot and sultry weather; and further, the public is brought to the recollection, that the College of Physicians in Moscow, called together by order of his Imperial Majesty, loudly declared it to be their opin-

* London Medical and Physical Journal, vol. 66, pp. 275 — 277 and 281, 282.

on, that the cholera could not be communicated from one person to another by goods or merchandize. Let not, therefore, the inhabitants of this town fear that the sickness is infectious; but rather let them, by an attention to their way of living, according to the regulations recommended, protect themselves against the disease, and in reliance on the forethought and precautions of the high authorities, to seek their comfort and consolation. The Livonian Medical Board will give the public constant accounts of the state of the disease.

Inspector, D. Dyrsen.'*

Extract of an account of the Symptoms and Treatment of the Epidemic Cholera in Persia, in 1822, by John Cormick, Esq.

'The disease first began in that part of the city which is most low, filthy, and crowded with poor inhabitants; and advanced from quarter to quarter of it, finishing its ravages in one before it commenced them in another. It was most destructive in the houses which were low, and possessed most inhabitants. In no case did I see a patient abandoned by his friends, under the idea that this epidemic was contagious. The idea seems, indeed, to be very generally abandoned. The family of the Prince quitted this city after the violence of the disease had already begun to abate. They, however, carried the epidemic along with them, and continued to be attacked, from four to six a-day, for about ten days, wherever they went, although not a single person of the villages through which they passed, or where they slept, took the disease. Was it that they carried the contaminated atmosphere along with them? or, being in a healthy climate, and amidst healthy people, thirtyfive miles from the city, they continued to suffer from their previous exposure to the unhealthy air of Tabriz? During our sufferings, ten or twelve thousand of the King's troops passed this city. They were prevented, by guards stationed at the gates, from entering it, but several of them passed the day under the walls. During the following day, however, the disease manifested itself among them, and they suffered from it very severely.'†

9. In a note on a preceding page the committee have referred to the information which came into their hands on the 11th of May, just when they had finished this report and were about to give it to the printer. As prefatory to the statements to be introduced here, the following remarks are offered.

There are three kinds of evidence to prove that an epidemic does not depend on contagion for its propagation, which are peculiarly strong. The first consists in cases of the disease

* Hawkins on Cholera, pp. 234, 235.

† Hawkins on Cholera, pp. 240, 241.

occurring in persons so insulated that they cannot have been exposed to contagion, or in situations, to which it is certain that contagion has not come. It is obvious that it is difficult to prove that cases are of this kind. To satisfy us we must have the evidence from persons on whose accuracy and fidelity we can rely ; and there must likewise be not one, but several, or even many, cases of this kind, so as to lessen the chance of accidental deception.

The second kind of evidence to which we refer is the occurrence of the disease simultaneously in different and more or less distant spots in the same region, without any apparent communication with a diseased place, and not in any regular succession from village to village and from town to town.

The third kind of evidence is found in the removal of patients from diseased to healthy localities, and the non-occurrence of the disease in these last. When this happens in repeated instances it may be regarded as showing that the disease is dependent on localities, instead of being propagated by contagion. Thus it has been said that forty thousand persons fled from Moscow while the cholera prevailed there without communicating the disease in the places of their refuge. Now this is very important if true; but this evidence is given in the lump, and we feel no assurance that it is true. Besides it is not certain, though it is probable, that a single one of the forty thousand persons carried the disease in him from Moscow.

Evidence of these several kinds has heretofore been presented us in reference to the cholera ; but not so much of it, nor of such a character as to have had much weight in our minds. In the extracts which follow it has been otherwise. They appear to us to come from gentlemen of accuracy and fairness of mind, and enjoying the opportunities for ascertaining the facts. In addition to these extracts we refer to the appendix, in which will be found a history of the 'Progress of the cholera in England.'*

The following extracts are not confined to the points above stated, but include other things which are important in a greater or less degree.

The first extract is from an 'Essay on cholera, founded on observations of the disease in various parts of India and in Sunderland, Newcastle, Gateshead, &c, by James Adair Lawrie, M. D., Professor of Surgery, Andersonian University. Feb. 1832.'

* See Appendix, E.

The author is represented to have been 'a very cautious and moderate advocate of contagion,' but as having 'moderated his sentiments on that head still further.'

'Kirkintilloch is a small borough, containing about 4000 inhabitants, situate eight miles northeast of Glasgow, on the north bank of the great canal. Hillhead is a village containing 330 inhabitants, about half a mile from the centre of Kirkintilloch, towards the east, situate on the verge of the south side of the canal.

'Previous to Sunday the 22d January, no peculiar disease prevailed in Hillhead; on that day a boy named M'Millan was taken ill while in church, with symptoms of cholera, and died early on Monday. Three other persons, Mrs Semple, Mrs Kinniburgh, and a boy (Morrison,) were taken ill in rapid succession, and all died before Wednesday. Up to Friday, 3d February, upwards of thirty have been attacked, and eighteen have died. The boy M'Millan had not been on board the vessels on the canal nor come in contact with any part of their cargoes; neither had he committed any error in diet.

'The origin of the disease in Kirkintilloch has excited some discussion. At first it was confidently attributed by the authorities and people on the spot, *to animal matters brought by ships from Hull, Edinburgh, and London, for the use of a manufactory in the neighborhood.* From inspection of the Harbor Master's books, I found that on December 22d, 1831, the Sibilla, Wm. Cowan, from Hull, discharged on the wharf at Hillhead, 3 tons 12 cwt. of horn shavings, loose; *supposed to have come from St Petersburg.* A portion of these was carried to Port Dundas, and in a few days re-shipped to Hillhead, in the Lady Augusta, Sharp. They were soon afterwards removed. On January 16th, the Delight, Primrose, brought *hoofs in hogsheads from London,* which were not emptied on the quay, and were removed on the 18th, four days before the disease broke out. When we consider that the supposed offensive matter from the last vessel was not emptied on the quay, that it came from London, and that the men employed in landing and conveying it to the manufactory, and working it there, have remained in health, there seems no reason for attributing the introduction of the disease into Hillhead to the horn shavings. By some it has been said that cholera may have been brought from Newcastle, by the regular traders between that town and Port Dundas. On this point I have obtained the following information. The Anne left Newcastle, December 31, 1831, underwent ten days' quarantine, and arrived at Glasgow on the 14th January, leaving no cargo at Hillhead. She was the latest vessel from Newcastle before the 22d; *the Dulcinea passed on the 29th.* No goods from Newcastle have been discharged on

the wharf during the month of January. *The harbor master's books show no other source from which the disease could have been introduced.*'

'In the village of Hillhead it was singularly confined to one locality, commencing in the house of a weaver, near the centre of a row which fronts the canal, and being confined to eight houses, all within eighty yards of the first. In these houses sixteen persons died — two others perished who were exposed to their atmosphere — and several within them recovered from severe attacks. To render it probable that this limited locality of the malady is to be explained by endemic causes rather than by contagion, Dr Lawrie adduces the following facts.

'1st. No communication could be traced between many of the persons who died, and those previously laboring under the disease. Major Berrie's gardener assured me, a few hours before his death, that he had not seen any of the people who had been attacked, nor been in their houses. The man Watson was afraid of the disease, and sedulously avoided those who were laboring under it. 2d. There has been constant communication between Hillhead and Kirkintilloch, but the disease has not, hitherto, appeared in a decided form in the latter place. 3d. Patients laboring under the disease, have been carried from Hillhead to Kirkintilloch, and have died there, but the disease has not spread in the neighborhood. Of this, there were two examples. After the death of Robert Gardiner, and his daughter, his wife removed, with four children, into the house of Mrs Horn, her mother, which is situate in the centre of Kirkintilloch. This abode consists of one room, not twelve feet square, in which three or four persons resided, previous to the arrival of Mrs Gardiner and family. Three of Mrs G.'s children were laboring under cholera. The child first attacked died; the two others passed through a severe form of the disease, but not an individual of those residing in the room, or neighborhood, were infected. I cannot help thinking that the lives of the two children who recovered, were saved by removing them from the house in which their father and sister died. The second instance is that of Mary Brown who went from the centre of Kirkintilloch, to wash the clothes and house of Mrs Dunn who had died of cholera. She remained some hours about the premises, returned to her own house, took cholera, and died; but not one of her neighbors have been affected. Except the two last mentioned, no death from cholera has occurred in the town of Kirkintilloch.

'Mendicants from Edinburgh visited places in the neighborhood, imbibed the local poison, returned and died, but did not communicate the disease to those around them.'*

* Medico Chirurgical Review, pp. 542 — 544.

The second extract is from a pamphlet on cholera by Mr Greenhow of Newcastle-upon-Tyne.

'The assumed capability of cholera being conveyed by shipping from one country to another, on which our system of quarantine is founded, very naturally gave rise to the suspicion, when it first appeared in the port of Sunderland, of its having been imported from some place on the Continent, where it was known to prevail; and several stories were in circulation descriptive of the manner in which it had thus been introduced. I shall not here repeat any of these tales, suffice it to say that none of them have been in any degree authenticated. That the ships which were blamed for having committed the mischief, were found to have been from uninfected ports, their bills of health clean, and their crews healthy; in point of fact they were fairly acquitted of the charge; and I believe the conviction is now almost universally entertained by the inhabitants of Sunderland, medical and non-medical, that the disease did not reach that place from any foreign source whatever. — It may be further stated that the first case of cholera which took place in this part of the country, was at a considerable distance from Sunderland, having been at a small village called Team, about two miles southwest of Newcastle. This case occurred to Dr Alexander, of Newcastle on the 4th of August, 1831.

'Other cases occurred at Newcastle simultaneously, if not before the regular appearance of the disease at Sunderland; although want of experience of its true characteristics, and unwillingness to believe in the fact, induced medical gentlemen to endeavor to prove that these were not cases of the new disease; yet subsequent observation has sufficiently proved their identity, and, I believe, it is now generally admitted. Such were the cases of Oswald Reay, which occurred in October, of William Armstrong in the beginning, and of Robert Jordan towards the end of November. On the 7th December the next case occurred, that of Maria Mills, with which commenced the official reports of the board of health of this place. The strictest inquiries respecting the origin of these cases have failed to obtain the slightest evidence of their having arisen from any infected source, and seem to prove, in the most satisfactory manner, that, however the disease may have since extended itself, its commencement in the country was spontaneous, upon whatever causes it may have depended.' *

'We have seen how imperfect was the evidence on which the introduction of the disease into the port of Sunderland, by means of ships from abroad, was attempted to be established. At

* Medico Chirurgical Review, pp. 563, 564.

Newcastle not even a suspicion of the kind has arisen. And though at Gateshead the first patient was said to have been lately in that part of Newcastle where the disease prevailed, it yet had no connexion with the fearful number of cases which occurred simultaneously ten days afterwards, in every part of the town ; in nearly fifty different points, cases occurred almost at the same instant. "On the 25th,* about one o'clock," says Mr Brady, "we were assailed by a third and fourth example of the disease, and before the next morning at ten o'clock very considerable numbers had fallen sacrifices to its pestilential ravages.

'"Within a space of twelve hours it spread itself over a diameter of two miles, and appeared to pay but very little distinction to altitude of situation, for the higher parts of the town were laid under its stroke in an equal degree, or nearly so, with the lower. Pipewellgate, Hillgate, the banks above Pipewellgate, Oakwellgate, the lanes leading from it, Jackson's Chare, Nun's Lane, Wreckinton, Gateshead Low Fell, Low Team, situations as different in their external characters as can well be conceived, were all indiscriminately exposed to its fury, and I do not think the cases were one whit milder in the more elevated than in the lower parts of the town." ' †

The third extract is from a pamphlet by Mr Moiz, surgeon, secretary to the board of health at Musselburgh. Mr M. is a firm believer in contagion.

'From the appearance of the disease in Mid-Lothian, to the present moment, there has not been a single break in the chain of contagion — not a single instance in which its source was not to be traced. Since the illustrations I have noted were marked down, a third more remarkable sorites has occurred in the family of Mr M——, a gentleman of extensive connexions in the mercantile world, and whose loss has been very generally regretted. Underneath his counting-room lived an aged dependent, Jeanie Findlay, who was taken ill on the morning of Saturday, 28th January, and died on the evening of the same day. *No suspicion of contagion attached to her death, although thus sudden, being in the eightyfourth year of her age;* but on the Tuesday Mr M.'s third son was seized with cholera, — himself,

* 'Since this was written three cases have taken place within the walls of the prison, a building constructed upon the most approved principles, and in which the prisoners have been completely insulated, the strictest discipline having been observed, and all communication from without carefully guarded against. For a memorandum of these cases I am indebted to my friend, Mr Fife, of this town, to whose care the charge of the health of the inmates of the prison is committed.'

† Med. Chi. Review, pp. 569, 570.

and eldest son on the Wednesday, — and Mrs M. on the Thursday. All died from the immediate attack of the disease except the first, who lingered on till the seventh day ; and it was found that they had severally been sitting by the bedside of their old servant. As a still farther proof, however, that the contagion was thus engendered, two neighbors, Mr and Mrs H., who had gone in to see the old woman, also sickened and died ; and on Monday, 30th, her son, R. Stewart, a shoemaker, having carried from her house to his own some articles of furniture, was shortly after taken ill. When called in to him, I found him in a state of collapse, from which he could not be resuscitated ; and he died on the following morning. Within twentyfour hours of his death, his wife was also taken ill, and was sinking into the cold stage when seen. This, however, she was brought through ; but being feeble and somewhat advanced in years, she fell a victim to the consecutive fever, five days afterwards. By unremitted exertions as to fumigations, the contagion has been checked, in so far as regards the other branches of the family.'*

The fourth and most important extract is from 'Observations on the history and treatment of Cholera Asphyxia, as it has appeared at Haddington. By Robert Lorimer, M. D., and James Burton, M. D., Secretary to the Medical Board. Edinburgh, 1832.'

The disease first appeared in Scotland at Haddington. A good opportunity was there afforded to ascertain whether the disease was imported. It might have been imported by land or by water. Drs Lorimer and Burton give their testimony in this case, in such a manner as to engage our confidence in their capacity and fidelity as witnesses.

The reviewer gives the following brief account of Haddington.

'On referring to Brookes's Gazetteer, we find that this borough is sixteen miles east of Edinburgh. Its population was 4,370 in 1811, and 5,255 in 1821, an increase of nearly a thousand in ten years. Supposing that the increase has proceeded at the same rate, and it ought to advance at a greater, the population at present will amount to upwards of 6,000. The cholera commenced in the place on the 17th December, 1831, and on the 23d of February, 1832, the total number of cases was 125, or 1 in 48 ; the total of deaths 54, or $1\frac{1}{9}$ in 111. Of the 54 persons who died, 22 were men, 30 women, and 2 girls. Of the 125 who were attacked, 50 were men, 66 women, 1 boy, 8 girls. The

* Medico-Chirurgical Review, pp. 575, 576.

female sex has hitherto suffered much more than the male in this country.'*

The following passages are from Drs L. and B.

'The town of Haddington is situated on a plain about a quarter of a mile square, bounded on the south and east by the river Tyne, having its course eastward.

'The elevation of the town above the level of the sea is somewhat under one hundred feet, and the whole surrounding country, except on the river side, rises from it as a centre. The streets in the town are wide and airy, but there are numerous sections by lanes, which are ill ventilated and filthy.

'The suburb of Nungate, irregularly built, also abundantly filthy, ill ventilated, and inhabited principally by the poorer classes, is on the east side of the river, (about one hundred yards wide here,) and the line of communication is by means of a bridge, the water being pent up by a milldam running across from that part of the town in which the disease first appeared, to the Nungate side.

'It is worthy of remark, that the refuse of three tanworks, the town slaughterhouses, and two common sewers, intersecting the town, is discharged into the river at or near this place.

'The cholera made its first appearance in Haddington on the 17th December, 1831; and, after a few straggling cases, between which, with one exception, there was no communication traceable, it became general; confining itself, however, more particularly to the eastern districts of the town, and to the suburb of Nungate.

'The first patient was a confirmed drunkard, and had been exceeding in the use of ardent spirits more particularly for the two days preceding his attack. His residence was in a steep narrow lane, leading down to the river, in the vicinity of the slaughterhouses, and forming one of the avenues to a tanyard and bonemill, where there was a large depot of bones, &c, gathered from the surrounding country, and not imported from Hamburgh, as was reported at the time. If filth, dissipation, and the combined influence of many causes acknowledged to have a direct effect in depressing the vis vitæ, can, without the agency of contagion in its true sense, produce cholera asphyxia, we think it will be allowed that they had full scope for exercising their power in this case; and, *as there was not the most distant probability of the man having come in contact with any one laboring under the disease, or from the infected districts, we may certainly be justified in concluding, that the first case in Haddington*

* Medico-Chirurgical Review for April, 1832, p. 640.

was sporadic. The assertion that the disease was "brought from Newcastle," is too vague to have deserved notice, were it not that, through the public press at the time, it was asserted, with much confidence, that three shoemakers were the unhappy medium of conveying this malady. If this were the case, the men must consider themselves more than fortunate in having escaped the addresses of their unsparing fellow traveller. The truth is, the three persons alluded to, named Frazer, Gow, and Walker, left Newcastle on the 9th or 10th of December, travelling on foot, resting eight nights on the road, at different stages, and arriving in Haddington *after the first case had been ill for twenty hours.* They never saw the man, they had never seen a case in Newcastle, have never been attacked themselves, nor have they communicated the disease to any of their families or neighbors.

'As already remarked, the first case appeared on the 17th December; the second *on the 25th* a girl, æt. ten or twelve, of a delicate constitution, who lived in the neighborhood of the first. *She had no communication with him, or the inmates of the house in which he resided, but had been exposed for some time in a thin dress, on the evening before her attack, which proved fatal in a few hours.* The house in which she lived communicated with the entry to the tanyard, was damp, ill ventilated, and inhabited by her father, mother, and numerous family, all of whom were more or less exposed to the influence of contagion, had it existed; yet not one of them had the disease until the 3d of February, when the eldest daughter, æt. 18, (who, from her occupation as a straw-hat plaiter, was necessarily much from home in another part of the town,) was attacked, and fell a victim to it. The family were thus again exposed to the risk of infection; but, up to this date, remain well, although no separation of the healthy from the sick was practicable from the limited extent of their dwelling, and no means of prevention have been used except whitewashing the house and washing the bedclothes.

'The third and fourth cases were women living in the same tenement, but in different apartments. Their house is situated in one of the dirtiest closes in the town (leading also to the river), about 150 yards from the residence of the last case. They both fell victims to the disease, without communicating it to any of the numerous visiters led by curiosity to see them during their illness, and after death. The husband and niece of one of the women removed to the family of a brother-in-law, *who was much engaged with them in attending their relation, and in cleaning the house, &c, after her death.* Four or five days after being thus exposed to the influence of all the causes producing the disease in his wife and her neighbor, the husband was attacked in the house of his brother-in-law; and, on the same day, the niece and

brother-in-law, *who also were exposed to the same causes in the poisoned locality.* The husband perished in six hours and a half; the niece and brother-in-law recovered; the girl, after a dangerous illness of three weeks. Here, let it be remarked, that none of the brother-in-law's family, in which they were ill, or the families in the tenement in which they lived, have been attacked, although nothing whatever has been done towards fumigating or whitewashing the house.* Owing to the long illness of the girl, it was not practicable to remove her for that purpose, and since, it has been overlooked.†

'Isabella Macleish, mother of case first in Appendix, died in a house in the Nungate, on the opposite side of the river from the close in which the third and fourth cases died. *She was a most dissolute character, and had no communication with any of the previous cases.* Three other women of similar habits, living in the same tenement, were subsequently attacked and died. Macleish's two children, and a child of one of the other women, had also symptoms of the disease; but none of the other inhabitants of the tenement have been attacked. One of these is an old man, with a cancer in the throat, and a debilitated constitution, living in the story immediately above the rooms of Macleish and the others.

'George Patterson and his daughter, also residing in the Nungate, though at some distance from these cases, took the disease on the same day: he died of it, the girl recovered; *but none of the family* (*though they all slept in the same room*) *have been attacked.*

'Mrs Robertson, also in the Nungate, on the outskirts of the suburb, died of cholera, and, though she was surrounded by a numerous family, none of them have taken the disease. Many similar instances could be adduced among the lower classes. Let us now, however, view the course of the disease among the more respectable inhabitants of the town.

'After a remission of the disease for nearly eight days (which took place upon the return of soft weather), we had a renewal of it (with great violence during two or three days) following a gale of wind from the north and east, with rain and snow. In this attack the better classes were its principal victims. In their families, the disease has been confined entirely to those first attacked, they being predisposed to it in almost every instance, and contagion here is altogether out of the question.

'One of the first of these cases was that of Mr S., who had

* 'For three days after the husband's death all his bedclothes remained in a heap at the side of the bed, *to which the niece was removed immediately after her uncle's death*; and in the same room (ten feet square) a family of eight or ten individuals resided.'

† 'A case occurred in the tenement on the 17th February.'

been subject to disorders of the stomach and bowels for some years. He died in the midst of a numerous family. Mr A. also fell a victim to the disease, surrounded by his family. Mr M. was attended by his mother, sister, and servant. Mrs A. and Miss C. also died of cholera, and in none of their families has there been any farther spreading of the malady. So much for "contagion" in this town. Its influence has not been more perceptible in the country, so far as we have had access to it.

'The case at Beanston Mill was truly a sporadic case, the subject of the attack being a poor woman who had neither been in Haddington, nor had any communication with any person from that place since harvest. She died of the disease after reaction had commenced. During her illness, she was well attended by several of her neighbors, besides receiving casual visits from many more. Not one of them has taken the disease except her mother; this case being in its results a farther proof of the limited influence of contagion, although at first sight it appears like a confirmation of its virulence. The woman, after a residence in the house of her daughter for about forty hours, returned home to the village of Athelstoneford, about two miles off, and was attacked with cholera on the second day after her return. She had visited the poisoned spot and received the disease (when attending a patient?) she did not communicate it to any one in Athelstoneford, which she probably would have done had it been contagious. There was another case in the village at the same time, between which and the old woman there was no communication. None of the attendants of either have been since attacked.

'The case at Knowes, six miles east of Haddington, was similarly a sporadic case. It is rather remarkable that both these cases are on the banks of the Tyne, and the general situation of both resemble that of Haddington. The poor woman who was the subject of the attack lost her life, but none of her neighbors, or her attendants, have been seized.

'There was one case at the village of Whittinghame, in which the disease did not spread, and two cases at Bees' Knowes (about two miles distant from the latter), which had no intercourse with each other, although the other inhabitants of the hamlet had free communication with both, with impunity. At Ruchlaw Mill, also in that neighborhood, there was a fatal case, which was not interred for three days after death. During his illness, and until he was interred, some of his family and friends sat up night after night in the house, and have not been attacked.

'A young man, named Hardy, who had been working for a week in Tranent during the prevalence of the disease, to its greatest extent in that place, came to his home in the village of Gladsmuir, and took the disease, but did not communicate it to his family, who are known to be highly predisposed.

'A woman, who was afterwards the subject of our first galvanic experiment, left Tranent while laboring under an attack of diarrhea, travelled on foot to the village of Samuelstone, became collapsed there, and was removed in a cart to Haddington. None of the people who saw her, and assisted in removing her, have taken the disease.

'Two of the servants of a gentleman's family, about seven miles east of this, took the disease, having had no previous communication with any of the infected persons or districts; they both recovered, and the disease has not spread in the family nor neighborhood. There was also one case at the village of Whitekirk, in which the disease has not spread.

'The disease has not attacked the village of Linton, five miles east of this, although the inhabitants are in daily communication with all the above places. It prevails at West Barns, four miles farther east. It has not attacked Belhaven nor Dunbar, both within two miles of West Barns.

'The disease, though it be admitted to have travelled down the river (as has been alleged), has not as yet ascended its course, nor have any of the inhabitants of high grounds around the infected localities been its subjects.

'It is remarkable, that, in its progress, very few instances of the disease have occurred in persons perfectly healthy; they, to a certain extent, appearing to enjoy something like immunity, from the severer symptoms at least; the aged, poor and laborious, the dissipated, with those subject to disease in the digestive organs, and whose minds were weakly constituted, being among its earliest victims, and almost invariably experiencing the severest attacks.

'The modifications produced in this disease by atmospheric changes open a wide field of inquiry, and we are sorry that our limited opportunity does not enable us to say much on this head. The accession of the disease here was during a hard frost, with northerly and westerly winds; and, on the other hand, mild weather, with south and west winds, prevailed upon the first remission; — increasing tenfold with severe weather and northeast winds, and now again decreasing with south and southwest and frosty nights.

'The diet of the poorer classes in this town and neighborhood consists principally of vegetable matter, and the use of ardent spirits is more or less general in the same class. Nearly all the medical attendants here were more or less affected with a peculiar uneasy feeling in the abdomen, sometimes amounting to tolerably sharp pain, and these feelings seemed to be increased, after an attendance upon the patients for any length of time in their own dirty and ill ventilated dwellings.'*

* Medico-Chirurgical Review for April, 1832, pp. 640 – 644.

The fifth extract is from the second edition of the work on cholera by Mr G. H. Bell. It goes to confirm some parts of the preceding statement by Drs L. and B.

'When the epidemic broke out at Haddington, Dr Meikle and Mr Bell were deputed by the Edinburgh board of health to proceed, in company with Major Macdonald, to the new scene of invasion. The following was their report.

"On our arrival at this place, accompanied by Major Macdonald of the central board of health, London, we found the Haddington board of health sitting, to which we were introduced by Mr Riddell, sheriff-substitute. The medical men of the town were in attendance (five*). The letter from the secretary of the Edinburgh board having been read, the president of the Haddington board assured us of their willingness to coöperate with us in any inquiries we might think necessary, and we take this opportunity of observing, that this assurance was acted upon to the fullest extent.

We were informed that no new cases of cholera had occurred since yesterday morning, and that there had been no deaths since the 28th. That six cases remained under treatment, three of which were almost well, and the others convalescent. That the medical men were convinced the disease was pestilential cholera; but that every endeavor to trace its source had failed. At our request the medical men accompanied us to visit their patients.

1. The first place we were taken to was the suburb called the Nungate, on the east side of the river Tyne. The case was that of a woman of the town, a confirmed drunkard. She had been attacked, we were informed, with symptoms of cholera, during the night of the 28th-29th. When first seen at half past 8 o'clock, A. M. of the 29th, she had no pulse; countenance sunk; skin cold and livid; cramps in lower extremities. Tongue white; much thirst; vomiting and purging of fluid having the appearance of meal and water. These symptoms disappeared under the use of stimulants. When we saw her (noon 30th), pulse 91, and weak; skin about natural temperature. She was *blind*, and was apparently suffering under the influence of narcotics. The blindness had just been discovered.

2. The next case we saw was that of a cabinet-maker, living in a clean and comfortable house in Haddington, on the west side of the river, opposite to the residence of the above mentioned case, and about one hundred yards in a direct line from her house, though, by the bridge, the distance must be a quarter of a mile. It was in this quarter of the town that the disease first

* "Drs Black, Lorimer, Howden, Cruickshanks, and Burton.

broke out. This man is reported to have been attacked at 3 o'clock on the morning of the 29th. When first seen, half past 8 o'clock A. M., countenance pale ; skin below natural heat, but not cold ; spasms in lower extremities, vomiting and purging of watery fluid ; thirst, heat, and oppression at chest ; pulse feeble and quick. Recovering under use of stimulants. No symptoms of cholera when we saw him ; no fever ; had made water.

3. The next case to which we were taken was that of Wilson, a carter, a very powerful man, of a dissolute character, living in the centre of the town. He is reported to have been attacked with cramps in the extremities on the 28th, after having been engaged in sinking a well. When first seen, the cramps were severe, and he had pain at the pit of the stomach ; neither vomiting nor purging ; no collapse. Immediately bled to 24 ozs. ; and opiates continued to be administered during the night. When seen by us, pulse high and tongue foul.

In all this we of course have seen nothing to authorize us to say that cholera prevails at Haddington, on our own observation ; but, from the reports of the medical men, who have treated the cases which have occurred, we have no hesitation in saying, that these must have been cases of the pestilential disease at present prevailing at Newcastle. The case No. 1 is the only one of those we have seen, presenting the character of a patient recovering from cholera ; and we are of opinion, that, in this case, the woman is in great danger of a fatal state of congestion in the head.

Our next object was to examine the evidence on the question of the source of the disease.

We found that three cobblers had left Newcastle in search of work on the 14th instant, travelled on foot, and arrived in Haddington on the 19th. They had not fled from Newcastle to escape from the cholera, but to escape starvation. For though they had heard a good deal about it, no cases had occurred near to where they lived ; *they had never seen any one ill of the disease, and none of their acquaintance had suffered with it so far as they knew.* This was the statement of one of them whom we examined, and we were informed similar statements had been made by the others. *The first case, that of William Craig, occurred on the 18th, the day before these men reached Haddington. They had formerly been acquainted with this man, but did not see him after their arrival. These men live in the neighborhood of the parts of the town where the disease has prevailed.*

The board at Haddington have only been able to trace communication among those attacked in one instance. Two of the women, whose cases proved fatal, live in different stories of the same house, or *land.* And it appears, that although not intimate acquaintance, they had spoken to each other on the previous day,

or on the day on which the first was attacked, and that on the day following the second was seized with the disease.

All the cases have occurred within a circle of about one hundred yards in diameter (but No. 3), and in a low and filthy part of the town on the banks of the river.

George Meikle.
G. Hamilton Bell.

Haddington, 30th December, 1831."

'After the minute detail of some cases treated at Haddington by Drs Burton and Lorimer of Haddington, and Messrs Meikle and Stevenson, surgeons, Mr Stevenson remarks as follows:—

"With respect to the mode of propagation of this disease in Haddington, all attempts to prove its introduction from Newcastle and Sunderland have completely failed; the disease first appeared on the Haddington side of the town, close to the river Tyne; at this point the river is dammed up and stagnant. At Nungate, Mrs Macgleish was attacked, and died. Pearson's wife was attacked on the Haddington side of the town, close to the river, and died; he then went with his children and niece, Margaret Thomson, and took up his residence in Dunbar's house, which is also near the river, in an ill ventilated dirty lane. Here Pearson immediately took the disease, and died after an illness of only eight hours,—his niece was attacked while he was under treatment, and Dunbar also complained that evening, but, on more minute inquiry, it was found he had been indisposed all the day before. I see no proof whatever, therefore, of contagion in this case. The day after the death of Pearson, James Wingate was seized: his house is in the same lane, three houses removed from Dunbar's: all communication was denied. On the opposite side of the river (Nungate) the next case makes its appearance (Laurie) in a lane behind Mrs Macgleish's house, it is positively stated by his wife that there was no communication whatever between the people of the two houses; in fact, Laurie had been ill of diarrhœa, and confined to his house for some days. This subject is still undergoing strict investigation on the spot, and it is to be hoped some light will be thrown on this obscure subject. As far as we are warranted in inferring from these few cases, the disease would seem to be more under the influence of locality than of contagion, especially when we see people whom terror induces to shut their doors and seclude themselves, are not exempt from that dreadful malady.

In these sentiments Mr Meikle entirely concurs.

James Stevenson,
Surgeon, Madras Establishment.

20, East Cumberland Street, 5th January, 1832."

'Mr Bell received from Mr Steele the following case, which is very interesting for several reasons. It is a decided case of cholera asphyxia, in Mr Bell's opinion; and was exceedingly well treated by Mr Steele, from first to last. It shows the advantage of venesection, even in the stage of collapse, and that of purgation, to ward off the fever which so generally supervenes.

"Adam's Row, Parish of Newton.

"*Jan.* 6, 2 P. M. — Mrs Ross, æt. 35. Complains of severe pains in the bowels, coming on at short intervals, with contraction of the muscles of the abdomen; — has been vomiting a fluid, resembling in its appearance barley-water, and evacuating per anum a fluid more nearly resembling perfectly pure water, with a small quantity of mucus diffused through it; — complains also of sickness and vertigo, with feeling of weight and burning heat at the præcordia; — severe spasms in the feet, legs, thighs, hips, and hands; — great prostration of strength; with thirst, and an urgent desire for cold water. Features sunk, livid, and deathlike; eyes dim and heavy; hands and feet cold; the other parts of the body not cold, but considerably below the natural warmth. The mouth inside is warm, but the breath is cool — nearly cold — respiration unaffected. Pulse 116, very small, at the wrist scarcely perceptible. Tongue white and moist. Has voided no urine since the attack came on.

For the last eight days she has been troubled occasionally with diarrhœa, accompanied with pains in the bowels, — last night, however, on going to bed, she felt perfectly well, but was awoke at four this morning with griping pains in the belly. She arose from bed at six, for the purpose of commencing her daily domestic labors, and felt a call to go to stool, — the evacuation was copious and natural, but rather loose. Before having time to dress, she became so sick, that she was under the necessity of immediately returning to bed; — her feet, legs, and hands now became cold, and affected with spasms; — she had another alvine evacuation about two hours after the first, which was dark colored and watery, and since that time has had constant sickness, with vomiting and purging of the peculiar watery fluid, as stated above, — the spasms at the same time becoming more severe, and extending to the thighs and hips. She had, about an hour ago, an opium pill of a grain and a half, with a glass of whiskey, and at present feels rather easier.

I immediately removed about fourteen ounces of blood from her arm, which was all that could be got away, and even that with much difficulty. The blood was thick and dark colored; and during its flow she became very sick, and vomited about eight ounces of the whitish watery fluid before mentioned. Her pulse at the same time sunk, and could not be felt at the wrist.

When the retching had subsided, she swallowed a pill, consisting of two grains of camphor and half a grain of opium, washing it down with half a glass of brandy mixed with water, — was ordered to repeat the same every half hour, — to apply a large sinapism to the belly, with bottles filled with warm water to the feet, legs, and other parts of the body.

5 P. M. — She has had no evacuations per anum since last report, and has vomited but little; what has been ejected from the stomach, however, has still the same appearance, but is imbued with something of a brownish color, probably the brandy or dissolved opium. Has taken six pills — has had severe cramps confined to the feet, with constant sickness and thirst — feet and hands are now warm — pulse a little improved, — ordered to take one pill every hour.

9 P. M. — Three pills taken — has vomited only once since last visit, which was about two hours ago — felt a call to evacuate the bowels, but without effect — no urine — some cramps occasionally in the toes — complains much of sickness, thirst, and headache. Lips blue — eyes sunk, and whole appearance of countenance *very cadaverous*. Pulse 116, a little stronger. Surface of body warm and clammy.

She was again bled to about nine ounces, when she became sick, as in the morning; her pulse *fell*, and the flow of blood stopped. Blood still thick and dark colored.

Pills and brandy to be continued.

Jan. 7, 10 A. M. — At one in the morning she had taken six of the camphor, and opium pills as above, when they were discontinued, and one half ounce of the mist. camphor, with five drops of laudanum and a little oil of cloves given every hour. She is now improved in her appearance: has had no spasms; body of natural warmth, and covered with a clammy perspiration. Pulse 112, soft, and of natural strength. Tongue white. Has vomited none, nor has she had any alvine discharge. Took some tea and biscuit for breakfast. She is at present giving suck, but the breasts have become quite flaccid. Complains of no pain except some degree of headache, which she describes as not very severe.

Intermitt. mist. camphor.

℞. Submur. hydrarg. gr. xxx.
Ext. colocynth, gr. x.
Syrup. simp. q. s. ut ft. mass. in pil. x. dividend; quarum sumat i. omni hora.

7 P. M. — Continues to improve: countenance resuming its natural appearance, but seems a little tinged. Only three of the pills taken, and no evacuation either upwards of downwards. Voided about fourteen ounces of high colored urine at 11 A. M., and again a smaller quantity in the afternoon. Had beef tea for dinner, and tea and biscuit in the evening.

Jan. 8, 10 A. M. — All the pills taken. Has been vomiting and purging copiously since six this morning. The fluid ejected from the stomach is tenacious, and of a dark yellowish brown color; that per anum is stated to have been 'black and green,' and in smell highly offensive. She complains of pains in the epigastric and umbilical regions. Countenance anxious and clammy; eyes heavy; conjunctiva of a yellowish tinge. Skin of natural warmth, dry; pulse 132, thready; tongue brown and moist; voids urine occasionally. States that on the afternoon of yesterday her milk was abundant, but that today it flows less freely.

8 P. M. — Has had several very dark bilious evacuations from the bowels; and twice since the morning visit, an attack of retching, with the discharge of a little frothy mucus. Urine flows freely, breasts flaccid; pulse 138, thready; tongue whitish; moist. Thirst urgent. Complains of considerable pain in the epigastric and lower part of the right hypochondriac regions, where may be felt a diffused hardness, tender to the touch. She also feels it uneasy when she moves her body, and lies easiest on the left side. Appearance of countenance as in the morning. Head uneasy, but not pained. Has had hiccup twice during the afternoon, and had an attack of it at the time of visit.

Jan. 9, 10 A. M. — Countenance resuming its natural appearance and expression. Complains principally of weakness, thirst, and the abdominal tenderness: no appetite for food. Pulse 128, soft. Tongue whitish. Slept occasionally during the night. No vomiting. Two dark colored alvine evacuations. Bilious, but not feculent. Urine voided in much the same quantity as when in health, and of same appearance. Has no milk in the right breast.

8 P. M. — Was cupped this afternoon over the pained part of the belly, but with little success; not more than two ounces of blood having been got away; pain still continues; pulse 112; soft and weak; no alvine evacuation; other symptoms as in the morning.

Applicet. Emp. Lyttæ parti dolenti abdom.

Extract of a letter inclosing the above case.

Craighall, 10th January, 1832.

In reference to the above case I may mention, that contagion seems to have had nothing to do in its origin. The residence of the patient is at least twelve miles from Haddington, with which place I have not been able to ascertain that communication of any kind had occurred. The woman is the wife of a collier; has had eight children; is cleanly in person; of temperate habits; of healthy constitution; and in so far as propriety of conduct in every respect can constitute a ground of exemption from the dis-

ease, in so far was she entitled to consider herself safe. She has had an attack of ordinary cholera of this country every autumn for some years past.

It is perhaps not unworthy of remark, that upon bleeding her, the blood, which flowed readily at the first, became languid in its current as the flow went on, and at last stopped altogether. That she became deadly sick and vomited, and the pulse died away; in this particular differing, so far as I have read, from most other cases of cholera, when the pulse is said to rise with bleeding.

(Signed) Geo. Steele, *Surgeon.*" '*

We have now presented the evidence, which bears on the question whether the spasmodic cholera is contagious, and the arguments on each side of the question. Yet it may be said that we have not brought the discussion to a proper close; since we have not clearly proved on which side the truth is to be found. This we are ready to acknowledge; but the charge of failure must be against the evidence. So at least we are willing to persuade ourselves. It was not for us to create evidence, but to collect it. It was indeed for us to estimate its value also. This we have endeavored to do impartially, as we were directed. If the minds of others are still in doubt, so we confess are our own.

The committee have indeed felt peculiarly bound to keep their minds open to the evidence which the farther progress of the direful epidemic should bring before them. They have resolved individually not to feel themselves pledged as partizans; but on the contrary to retain the liberty of taking either side of the disputed question hereafter, as the facts may justify them in doing. The epidemic may enter our own country; and nothing is to be more deprecated than that it should find the physicians of the country, either blindly, though unanimously, pledged to any one opinion, or arrayed as partizans in hot dispute on any doctrine in respect to the causes, nature, or treatment of the disease.

The publications last received from England, where the disease is now prevalent, give most support to the opinion that the cholera is not contagious, though they offer no other satisfactory explanation of its progress through the nations of the old world. In reviewing the whole evidence, relative to this question of contagion, it is not easy to say on which side that

* Medico-Chirurgical Review, pp. 435–439.

evidence preponderates. This is not said to save the responsibility of a decision, for the committee anxiously wished to give a decided opinion. But, in truth, all the witnesses have not yet testified. New facts will now be coming to us daily from the two most enlightened nations of Europe; and it seems to be a needless precision to decide to which side the balance of testimony inclines on a particular day. As regards conduct, it will be seen that the committee recommend all the cautions which rational contagionists would approve; while they deprecate those measures of restriction, which policy and humanity equally forbid.

Meanwhile, interesting as is the question respecting contagion in a scientific view, the decision of it is less important in regard to the interests of our country, than it may at first view seem to be. This is shown from two considerations. First, if the disease be contagious, so subtle is the contagion, that all efforts to prevent its passage from nation to nation have been hitherto unavailing. Second, where the disease does occur, its extension and fatality may be greatly limited, by municipal regulations and personal care. In other words, it affects with severity those who are predisposed to it by circumstances, which can in a great measure be avoided. These circumstances, called the predisposing causes, are all those which depress the vital powers of the human body, and have already been described. On the great influence of these causes there is scarcely a dissenting voice among those, who have witnessed the disease in Asia or Europe. If they can be removed it may be said the terror of the disease will soon cease. The entire removal of them cannot be expected; but they can be removed in great measure, and in this country we shall have no excuse if this be not effected. The mode of doing all this will be brought into view under another head.

One more inquiry will arise in every mind. If this disease be contagious, will it continue to afflict mankind like the plague and the small-pox. It is not for man to answer this question. The disease has continued, more or less constantly, with the same characters in India since 1817; but the extent of its fatality there has been greatly diminished. It has lingered long in Persia. In other countries we cannot yet say whether it has entirely ceased or not. But the arrest it met with in the winter of 1823, on the shores of the Caspian Sea authorizes the hope that it may ultimately cease to exist in cold countries at least, even though it be contagious. But if it do not

cease we may indulge the expectation that it may not, at all times, be equally severe and fatal. A century ago, and at some subsequent periods, scarlatina was as sore a plague as the spasmodic cholera has recently been. Now that disease appears among us, at most times, under so mild a form, that it is scarcely noticed as an evil.

But, if at last the spasmodic cholera now prevalent in Europe be not contagious, if the efficient cause be not a material emanating from the subjects of the disease, what alternative is there? What other cause can be pointed out?

To this we must reply that there is no other, which can be designated as in any degree probable. In that case therefore we must say the cause is not known. That miasmata arising from the soil, that is, some material arising from the soil, occasion fever in the human subject in many instances, may be regarded as certain; although these miasmata are made known to us only by their morbific effects. It might well be supposed that some analogous miasmata were derived from the soil in the places, where the cholera first began to prevail. But the facts which are notorious seem to show conclusively that the same miasmata cannot have been developed successively from the soil in the various places and climates, where the disease has since appeared. Among the other conjectures in respect to the cause, we do not find any suggestion more satisfactory. So that the question appears to us narrowed to a choice between contagion and an unknown cause. This last however should be adopted, if the evidence in favor of contagion be not ultimately sufficient. It is far from being the first instance, in which the researches of physicians have brought them to a similar result.

Prolonged as this discussion has been, there are some collateral points, as regards contagion, to which it seems proper to advert.

It is maintained by some medical men that the propagation of the cholera, in different places, is to be attributed not to one but to several causes. They not only admit the same predisposing causes to which we have referred, but they also suppose some general cause to exist, of the same character as those, which give rise to the various non-contagious epidemics, which visit all parts of the world. At the same time they maintain that the disease is contagious and that its propagation depends partly on that circumstance. Now we must say that the rule, not to multiply causes, is unnecessarily infringed by this explanation. If there be such a general cause as has been referred

to, there is no need of any other to account for the disease. Again, if the disease be contagious, that alone accounts for its propagation from region to region.

It is likewise maintained by some that many diseases, the spasmodic cholera one of them, though not essentially contagious, become so when they affect many persons, or when epidemic. Let us consider how this can happen. It may be supposed, 1. That there is a noxious material furnished from the body of the sick man, which might reproduce his disease in another; but that it is ordinarily diluted by the atmosphere and dissipated without doing any harm.

2. That such noxious material being furnished by many individuals, confined in the same apartment, and not sufficiently diluted and dissipated by the atmosphere, may be capable of producing the same disease as that, by which the individuals furnishing it are affected.

These suppositions must be admitted as possible; although we are not ready to say that they have ever been proved to be true. This has been called the doctrine of contingent contagion.

But something different from all this seems to be meant by some pathologists, who also speak of contingent contagion. We are accustomed in speaking of a disease almost to personify it. We say, it travels through a country, it rages in a city, it exhibits a malignant character. This figurative mode of speech is very convenient. But we are sometimes misled by it. In this case the doctrine seems to be that, when ten are affected with a disease, it may not be contagious; but when it has affected five hundred or a thousand men, it acquires a contagious character; and this independently of any crowding of the sick. Here the disease is regarded as something passing through the bodies of many men and liable to be changed in its passage. If this were supposed in regard to the virus of a contagious disease, there would be some greater semblance of truth. We may speak of the vaccine virus, which has passed or been transmitted through a thousand subjects. But here it is not true that one and the same portion of virus has so passed. But if a thousand men are affected by catarrh in one city and ten in another, surely the disease could not be said to be changed by passing through, or affecting more subjects in the one, than the other. The last man affected would not undergo a different disease, whether nine or nine hundred and ninetynine in the same city had previously undergone that disease.

On the other hand, that the cause producing the same disease, so far as marked by its symptoms, may be different in different cases, is very certain. Catarrh is produced by exposure to a vicissitude of temperature. It is likewise produced by the effluvia from a rose.

It is then very possible that the cause producing cholera at a particular time and place may be wholly or partly new; and that the disease, so produced, may have, added to its ordinary characterestics, the property of reproduction. In other words, that those affected by it may furnish a morbid poison, which can reproduce it in others, though this had never before happened as to the same disease.

In respect to diseases known to be contagious, various laws have been ascertained by observation. If this cholera is regarded as contagious, it is important to ascertain whether any such laws have been discovered in respect to that. On three points especially it is desirable for us to obtain information. 1. How long after exposure to the disease may it occur in the person exposed, or what is its latent period. 2. Can the same person be affected more than once by this disease. 3. Can inanimate substances be the medium of communicating the disease.

If all contagious diseases were alike in these respects, these inquiries would not demand our attention, provided we had satisfied ourselves that the disease in question was one of them. But it is known that in these respects contagious diseases do not resemble each other. We shall therefore inquire what answers can be obtained to those questions on the supposition that the spasmodic cholera is contagious.

1. What is the latent period of contagion in the case of cholera?

It has been urged as an objection against the contagious quality of this disease that this point has not been decided. But in truth this point was not decided in regard to some of the most severe contagious diseases, until they had been known to mankind for centuries. So far as we can rely on the accounts which have been published, we are justified in believing that the latent period in cholera is short. The disease occurs sometimes within twentyfour hours after exposure; and in no instance have we seen reason to believe that it has occurred later than seven days after exposure. In making this statement we might except the instance of the alleged communication of the disease at Mauritius in 1819 by the frigate Topaze.

But this relates to a disputed matter, into which we do not desire to enter. And, if it be true that the Topaze did carry the cholera to Mauritius, it is most probable that the disease existed covertly between the period of its arrival and that of its becoming generally known.

The ship *General Harris* 'arrived at Madras on the 20th of June, 1821; her crew were in perfect health and had been so during the passage from England. On the 27th of June epidemic cholera made its appearance among them and raged with great violence.'

In a case like this we have all the advantages of an experiment. If it be admitted that the disease was not produced by a cause on board the ship, but by some cause in the port at which the ship arrived, it is proved that that cause could produce the disease within seven days. If that cause was contagion, then the latent period may amount to seven days. But probably it was less; as it is not likely that the crew went on shore immediately on the arrival of the ship. Also the first case might not have been noted.

Various cases of cholera on board ship upon the coast of England in the winter past aid us in deciding upon the latent period. To copy all the details of this kind would add too much to the length of this report. Suffice it to say that they lead us to extend this period to seven days.

But in some contagious diseases the latent period varies greatly in different instances. In the case of scarlatina we are disposed to believe it to extend from two days to a fortnight. Future observations may show how far this is true in respect to the spasmodic cholera. But, with the exception of the case of the Topaze already noticed, we have seen no instance to show that this period is more than seven days, and we are disposed to think it is usually less. If that case be admitted, the most it can prove is that the latent period may be three weeks.

2. Can the same person be affected more than once by this spasmodic cholera?

On this point our information does not permit us to decide. Relapses in those not fully recovered are said to have been frequent. In some instances the disease is said to have occurred in the same person twice and even thrice. Mr Bell speaks of this as common. But we are assured by Mr Jameson that, if such instances did occur, they were extremely rare. The following extract from his report contains so much curious information, that we are unwilling to abridge it.

'Another curious circumstance in the economy of the disease was, that, not only were persons, who had once undergone its attack, free from its further assaults; but even individuals, and bodies of men, who, having come within its pestilential influence, had escaped unaffected, were nevertheless much less obnoxious to its future visits, than those, who had not before been exposed to the virus. In other words, a village, which was visited by the epidemic during the first year of its prevalence, would, on the disease reappearing in that part of the country, be much less likely to suffer, than another village, which had not before been affected; and an individual, going from the former into the infected air of the latter, would have a better chance of immunity, than its inhabitants, who had not undergone the previous seasoning. This was the case, to a greater or less degree, in every part of the Provinces; in which it was generally remarked, that the epidemic, on its recurrence, either did not at all revisit the places formerly affected, or only in a much lighter manner, than those, to which it was yet a stranger. In Tirhoot, particularly, in which the epidemic twice appeared at two distant periods, the truth of this observation was strikingly illustrated; since according to the information of a very intelligent observer, not a single instance occurred, of the disease revisiting the same place, throughout the whole extent of the district.

'But, it is in the different divisions of the army, the bodies composing which long remain under the eye of the same medical officers, that we should expect to find the existence of this law most clearly established. It is here, accordingly, that we have the best examples of its reality. Thus in the Jubbulpore force, the 7th Regiment of Cavalry, and 2d Battalion 13th Native Infantry, which corps had suffered severely in November with the Centre Division, and at the Bridge of Boats, remained quite exempt. Thus too, the 2d Battalion 19th, which was violently affected by the disease in August, had only three slight cases in September; when the other corps of the Rajpootana force were so roughly visited. But the best illustrations are to be found in the Centre Division. When this force broke up after the termination of the campaign, His Majesty's 24th Regiment of Dragoons, and 87th Regiment of Foot, and the 1st Battalion 8th Regiment Native Infantry, marched to Cawnpore; where they were stationed in April and May, when the city and cantonment were suffering from the disease. At this time the 24th Dragoons remained quite free; His Majesty's 87th had two slight cases, among the recruits who had not been with the Centre Division, and no death; and the 1st Battalion 8th Regiment N. I. had, according to one statement, no case, according to another, one only, and according to a third, three or four, all slight attacks. The situation of the latter corps was such, as to give

additional proof of the immunity of bodies previously exposed not being accidental. For it so happened, that this Battalion was placed right between the 2d Battalion 15th N. I. and Craigie's Levies; both of which suffered severely, as not having earned the same means of protection. Camp followers of all descriptions were equally exempt; and one person only, an European officer, who had been with the Centre Division, fell a victim to the disorder. In like manner, the 2d Battalion 25th Regiment Native Infantry, which again fell in with the disease in April, whilst marching from the Tiraee for Lucknow by Gorruckpore, then suffered comparatively little. It had indeed 25 cases and 5 deaths; but of these only one was a case of relapse or recurrence, and even in it the symptoms of both attacks were very mild. But a still more extraordinary instance occurred in Lord Hastings' camp, during the march to Gorruckpore, towards the latter part of the same month. The disease here first broke out among the followers of a gentleman, who had just joined the party; and in a few days attacked between 50 and 60, out of 400, chiefly of the class of bearers. It next got among the servants of several gentlemen in the civil service then in attendance upon the Governor General; and to the period of its decline, was confined to such persons, as had not been with the Centre Division. This could not be explained on any difference of situation; for the party daily changed ground, and the new comers were mixed promiscuously with those, who had been previously exposed to infection. Nay, it further appears, that after attacking the first party, the disease made a long stretch, and next showed itself amongst other persons, not yet seasoned, in the opposite end of the line: leaving all between untouched. If any other proofs were necessary, we might cite the case of the 2d Battalion 3d Regiment, the greater part of which, having had the disease at Shergurh, were not at all affected, although stationed at Banda, when the town suffered severely. But enough, we think, has been already said, to show, that the human frame, on being exposed for some time to the pestilential virus, got habituated to it, and in a great measure became insusceptible of its malignant influence.' — pp. 190 — 194.

In reference to the last sentence of the foregoing abstract we may remark that a different inference might be drawn by the advocates for the contagious character of cholera. They might consider the preceding facts as showing that all, or nearly all, who were predisposed, had been affected in the first exposure; and that the few only, who had then escaped casually, or who had subsequently acquired a predisposition, were affected at the second exposure.

We do not find any material facts noticed in Europe, which go in contradistinction to those observed by Mr Jameson. But in Persia some facts of an opposite character are stated, and at Astracan the disease first prevailed slightly and subsequently with severity.

3. Can inanimate substances be the medium of communicating the disease ?

Most of the observations made on the subject would lead us to decide in the negative to this question. It is not easy in all instances to explain the transmission of the disease from place to place by the sick in person. For instance, it is not known, certainly not to us, how it reached Orenburg, Moscow, St Petersburg and various other places. Hence it has been suspected that it was conveyed by merchandize. But no distinct evidence to this effect has reached us.

It would seem that, if the disease could be conveyed by merchandize, it would have been extended more rapidly than has actually happened. That it cannot be conveyed in this way to very great distances is almost certain. The commerce between Bengal and Europe and between Bengal and our own country has been constant from 1817 to the present day. Yet the disease has not been communicated in this way. There is a general probability that new goods, the common articles of merchandize, are not exposed to the sick. This probability however is less in regard to the goods from India, than in most other cases. The cottons brought here from Calcutta are handled piece by piece and packed in the store-houses of our supercargoes there. In this labor the natives are employed and these spend their time mostly in these store-houses. From the sudden mode of attack we presume it must have happened occasionally, and perhaps frequently, that men seized with the cholera would throw themselves upon these goods, when lying in their way. The goods then would have every chance for receiving and conveying virus if capable of it. Perhaps it may be thought that the length of the voyage, usually four months, would give time for the contagious matter to become effete. It may be so ; but probably we may in this country rely on the same safeguard in respect to goods from Europe. For when goods are closely packed we can hardly believe that the difference of one month and four would occasion different results in this respect. But the most probable conclusion is that the virus could not be so transmitted.

In regard to rags, which may contain the clothing of the

sick, it may be thought that the danger would be greater. And on this point it may seem important for us to be watchful, since rags are frequently brought to this country from Smyrna and also from the north of Europe, where the cholera has prevailed the last year. We must acknowledge however that we cannot entertain any strong fears even in respect to this article. Rags have been imported from Smyrna so often, when the plague has prevailed there, without introducing that disease among us, that we cannot think it probable that they will introduce the cholera. Yet the sacrifices from any precaution as to this article must be so small, that we would not urge an opinion which should discourage the requisition of those sacrifices.

Since the foregoing was written the committee have seen the following communication from the British Board of Health. They believe that the whole will be acceptable to their readers.

'CENTRAL BOARD OF HEALTH, COUNCIL OFFICE,
WHITEHALL, JAN. 4, 1832.

QUARANTINE.

Reasons, founded on authentic facts in the history of Spasmodic Cholera, for establishing a specific code of sanitary restrictions for that disease, considered independently of Plague, Yellow Fever, and other infectious maladies.

1. If the sole object of sanitary police were to protect communities at all risks, from being infected by their neighbors, medical science need not be consulted; as an absolute cessation of intercourse with the suspected would be the only measure necessary.

2. But as such a measure would be nearly, if not altogether impracticable, under the present circumstances of society it is essential to endeavor to determine the point of time, at which the danger of infection by any particular disease ceases, and consequently, the period at which free intercourse may be resumed with those who had been thought capable of communicating the disease to others.

3. When sanitary police was first established, spasmodic cholera was unknown, and medical science in Europe was but little advanced. The very word *Quarantine*, and the forty days' restraint which it indicates, do not seem to have been derived from a well authenticated knowledge of the individual sanitary histories of the diseases against which the restriction was first directed; and have been since kept up, partly from ill-defined apprehension, and partly from reverence for old institutions. It must, however, be allowed, that a much longer separation from suspected persons is called for in diseases in which infective matter is proved to be generated, and thrown out upon the surface of the body, and upon

the clothes, as in plague and small-pox, than where no such matter is generated.

4. Yet it is certain, that even in these last diseases, the maximum of the period of incubation, or interval between the reception into the system of the infective germ, and the manifestation of the symptoms, does not exceed one third of the quarantine founded on the doctrines of Fracastorius, and the sanitary laws of the 16th century.

5. The utmost length of time during which the safety of the public health absolutely requires sanitary precautions, as to persons or effects supposed capable of communicating the infective germs of any given disease, ought to be determined by what experience in that disease may have established on the following questions, viz :

First. What is the longest interval of time between the reception of the infective germ into the constitution, and the manifestation of the first symptoms of the disease ?

Second. The period during which an individual may retain the power of infecting others with the disease from which he is himself convalescent ?

Third. The capability of certain classes of merchandise to retain, and afterwards to communicate, the germs of the malady.

6. Numerous and authentic data tending to elucidate these three questions, so far as they regard spasmodic cholera, have been furnished by the extensive prevalence of that disease, since 1817, in our East Indian possessions; by our commercial intercourse with Prussia, and other infected countries on the continent of Europe; by the recent investigations of the Medical Commissioners sent to these countries from different governments; and finally, by the laborious and accurate observations of the most enlightened physicians of the countries where the disease has prevailed or is now prevailing.

First Question. — *Period of Incubation.*

7. The following are a few of the many facts which seem to settle this period with tolerable accuracy.

" The subsidiary force under Col. Adams, which arrived *in perfect health*, in the neighborhood of a village in India, infected with cholera, had seventy cases of the disease the night of its arrival, and twenty deaths the next day."*

8. His Majesty's 54th regiment landed at Madras on the 10th of May, in a remarkably healthy state, after a voyage of forty-eight days from the Cape of Good Hope, and marched into quarters in Fort Saint George. Cholera appeared amongst the men within three days after their landing.†

9. In eighteen vessels which arrived in England between the 26th of May and 24th September, from infected ports in the Bal-

* See Bengal Report, pp. 22, 23. Many other strong facts, of a similar nature, will be found in that able work.

† See Madras Report, p. 22.

tic, each vessel having had one or more cases of cholera on the passage, the greater number of attacks took place previously to the *fourth*, and only one attack so late as the *sixth* day of sailing.

10. Dr Becker, of Berlin, gives the subjoined statement in his report.*

"From August 29th to September 26th, there have been reported cases of cholera in Berlin, 770.

"During that period, a second case has happened in the same house where one case had been reported —

"After 1 day 65 times.
" 2 days 34 "
" 3 days 23 "
" 4 days 16 "
" 5 days 21 "
" 6 days 7 "
" 7 days 3 "
" 8 days 2 "
" 9 days 0 " "†

11. The British Medical Commission lately returned from St Petersburgh, after detailing a series of cases upon this point, concludes thus :

"That in the above cases, in all of which the time intervening between an only exposure to infection, and the subsequent development of the disease, was most accurately marked, the period of incubation ranged between one and five days."

12. The Genoese Medical Commission, sent to Hungary and Vienna to study the nature and history of spasmodic cholera, state, in two distinct reports to the Sardinian government, their decided conviction, derived from protracted observation, and personal experience in cholera quarantine establishments, that those who have absorbed the germs of the disease are generally attacked before the *third*, and always before the *fourth* day.‡

13. The Board are aware that accounts have emanated from respectable sources, of persons having been seized with cholera many days after their departure from infected places ; but as the history of these individuals during the interval between the supposed last exposure to infection, and their subsequent attack, does not appear to have been accurately noted ; and as even these instances are very rare, the Board would not feel themselves jus-

* See papers on cholera, published by authority of the Lords of the Council, p. 62.

† Other sources of infection were open to all these persons, but the very great proportion of attacks (one hundred and fiftynine out of one hundred and seventyone) having taken place within the first five days, furnishes, if not direct proof of, at least a strong presumption as to, the period of incubation.

‡ See the Report of the Genoese Board of Health.

tified in allowing their opinions to be influenced by such insulated statements.

14. It appears, then, with regard to the first question, to be clearly established, that the longest interval between a well authenticated *latest*, or only exposure to the infection of spasmodic cholera, and the subsequent manifestation of that disease in a susceptible person, has been from *five to six days.*

Second Question. — *Length of time during which persons convalescent from cholera may retain the capability of infecting others.*

15. In a sanitary point of view, persons recovering from any disease cannot be contemplated independently of their clothes, bedding, and other susceptible personal effects.

Whenever persons unaffected themselves with cholera (whether convalescent or not) have been conductors of the germs of the disease from the sick to the healthy, the latter have always been attacked within the period of incubation already specified.*

16. The Genoese physicians already quoted, state that in the *Cholera Quarantine Establishment* which they had such ample opportunities of observing, no one was ever attacked after the sixth day.

17. No ship has ever arrived in this country from India since the first appearance of the disease there, nor within several thousand miles of our shores, with the disease or its germs on board, although 103,376 bales of cotton have been imported from that country within the last three years.

18. No individual has ever been attacked on board ship south of the Baltic on the passage home, nor in any of the quarantine establishments in England, since cholera first broke out on the shores of that sea.

19. But as a single well authenticated instance of cholera having been communicated to a healthy community by persons recently recovered from the disease, or by their effects, would be enough to demand quarantine precaution to the amount, at least, of something above the longest interval between the recovery of the one and the first appearance of the disease amongst the other party; and as there is reason to believe that the first case of declared cholera at the Mauritius in 1819, did not occur before the fifteenth day from the arrival at that Island, on the 29th of October, of the Topaze frigate, and the landing of her sick, after having had several cases of cholera on the voyage from Trincomalee, which place she quitted on the 9th of the same month ;†

* See Papers on Cholera, published by authority, page 53.

† See the Journal of the Surgeon of the ship, (Mr Fog) Medical Gazette, 19th Nov. 1831, p. 226.

and as the data which tend to determine the period indicated in the second, are by no means so numerous nor so precise as those which bear upon the first and third questions ; and as those must be considerably modified by the conditions under which the recovering or recovered person or persons are placed with reference to cleanliness, ventilation, food, &c ; and as precaution naturally increases with undefined apprehension, the Board, until more precise facts on this question can be obtained, must consider persons ascertained to be but just convalescent from cholera, as coming under the most aggravated circumstances of a foul bill of health.

Third Question. — *Capability of merchandise to convey and afterwards communicate the infective germs of cholera.*

20. There is no question in the whole range of sanitary police, on which so many and such irrefragable facts can be brought to bear, as on this ; derived, too, from the most authentic and recent sources. Seven hundred and thirtytwo ships, loaded with hemp and flax from infected ports of the Baltic, arrived at the different quarantine stations in this country between the 1st of June and the 31st of December, 1831. Many vessels also arrived laden with wool and hides, yet not a single case of cholera occurred on board any of these ships outside the Cattigate sea, nor amongst the people employed in opening and airing their cargoes in the lazarets.

21. At the hemp and flax wharves in Saint Petersburg, where several thousand tons of these articles arrived during the spring and summer of this year, from places in the interior where cholera existed at the time of their departure for the capital, the persons employed in bracking or sorting, and who generally passed the night amongst the bales, did not suffer so early in the season, nor so severely, as other classes of the general population.

The same observation holds good with respect to all the ropewalks of St Petersburgh ; and the imperial manufactory of linen cloth at Alexandrofsky, where all the yarn used is spun from flax bracked and hackled on the spot.

22. Struck with the importance of the above, and other similar and authentic facts connected with the sanitary history of cholera ;

Holding in view also the unnecessary embarrassments to every kind of intercourse, caused by the adoption of plague precautions against individuals, communities and merchandise affected with, or suspected of, cholera only ;

The strong inducements to elude sanitary restrictions, furnished by their own severity ;

The inefficiency of cordons by land, from the impossibility of their being made perfect, except by a system of coercion entailing greater evils than the disease itself ;

The panic and other dangerous moral, as well as physical effects, caused by vexatious insulations of families and communities ;

Some of the most commercial nations of Europe, as well as those still exempt from, as those already infected by, spasmodic cholera, have lately reduced, very considerably indeed, the quarantine restrictions which they had hitherto directed against that particular disease.

23. Lubeck, a territory perfectly exempt from cholera, reduced its quarantine upon persons and merchandise arriving from infected ports, first from fortyone to twentyone, and then to ten days.

24. A similar reduction has taken place at Copenhagen.

25. In Prussia, persons and merchandise from infected places, are subject to a detention of only five days.*

26. The Board of Health at Genoa have modified their quarantine code, taking as the basis of their new arrangements, the maximum of the period of incubation of cholera, as determined by their own medical commission already quoted.

27. Guided by what experience has already established, as to the laws which seem to regulate the propagation of cholera ; and having in view the enlightened decisions which the sanitary authorities of other countries have come to on this subject, the Central Board of Health feel themselves justified in giving it as their opinion —

1st. That the maximum of sanitary restriction, or quarantine of observation, for an individual in health, but suspected of carrying the infective germs of spasmodic cholera as yet latent in his organization, need not exceed ten days.

2d. That the period of separation from the healthy, of an individual ascertained to be but just convalescent from cholera, need not exceed twenty days.

3d. That ordinary diarrhœa, containing one or more days, being often the first symptom of cholera, persons arriving from infected places, laboring under even the mildest degree of purging, should not be admitted to free pratique, before the 8th day after perfect recovery from the same.

4th. That the clothes, bedding, effects, and sleeping places, of all persons on board vessels from infected ports, ought to be opened, aired and purified during three days after their arrival, although the length of the voyage may have exceeded the period of quarantine adjudged in such cases to healthy ships and unsusceptible cargoes.

5th. That the longest period of detention, for airing and purifying merchandise of the most susceptible class, and arriving

* See Prussian State Gazette, 26th Sept. 1830.

under the most suspicious circumstances, need not exceed fifteen days, to be counted from the day on which the airing may, *bona fide*, have commenced.

Finally. The Board see no reason to believe that the above suggestions, directed against spasmodic cholera, alone, require any modification in reference to climate.

(Signed,) E. Stewart, *Chairman.*
Willm. Pym, *Sup't Gen. Quarantine.*
J. Marshall, *Lt. Col.*
Willm. Russell, *M. D.*
D. Barry, *M. D.*

V. What is the proximate cause of the spasmodic cholera; or, in other words, what are the actual changes in the body when affected by it?

In considering this question we must bring to mind the phenomena of the disease during life and the effects of it which are ascertained after death. In the present inquiry it would be idle to bring into review the opinions and doctrines of former ages; for never before were the characters of the disease more carefully noticed than during this epidemic, and that too by men qualified by their acquaintance with all the branches of medical science to observe and describe the disease accurately; and never before were there made so many examinations of the victims of cholera of any kind, by which the various conjectures respecting the disease might be refuted or confirmed.

If we fix our eyes on a patient under this disease, it is impossible not to conclude that he is acted upon by some most violent and deleterious agent. Such an agent we are accustomed to call a poison. The use of this term decides nothing as to the nature of the principle or its source, and therefore we may venture to speak of that, which is the most efficient of the remote causes, under this name, without placing ourselves at war with any party by so doing.

In commencing the investigation of the proximate cause it would be premature to decide, whether this poison acts on the whole system or on a part only. We cannot say therefore whether we ought to commence by examining those changes, which may be called local, or those which may be regarded as general. As we must choose, we shall first speak of those phenomena which belong to the whole system, and afterwards of those which belong to the alimentary canal. It is plain that the constitutional symptoms may be regarded, either as the di-

rect effects of the poison, or as arising indirectly from the local influence of this agent on some single organ. But our first views of the case would be the same on either supposition; for we shall first inquire simply what are the actual changes wrought in the system, not how they are wrought.

Is there in these constitutional symptoms anything peculiar? On the contrary are they not such as are common to various diseases. At the invasion of indiopathic fever, at the commencement of any grave and sudden local affection, or when the system is the subject of any violent and extraordinary shock, symptoms are usually witnessed of the same kind as in the attack of cholera. The violence and severity of these symptoms vary exceedingly in the cases just referred to; and so does their duration; but they are the same in kind. In this spasmodic cholera they are described as violent in the most extreme degree. But so are they in various grave, epidemic fevers. In the epidemic petechial fever, which prevailed in various parts of New England and in some of the adjoining country from 1808 to 1814, we witnessed the same symptoms or nearly the same, with the same exaggerated character. In that epidemic, too, it was often seen that the powers of life were at once overwhelmed and life ceased, without an effort to rally, under the stroke it had received. It is this, which is so common in and is regarded as among the characteristics of the cholera of India. But, when the functions of life do not cease at once, they are depressed in an extreme degree. We may notice first the failure of the heart to perform its functions. This organ contracts with less and less force, while the blood is sent back from the extreme vessels through the veins, not indeed rapidly, but more rapidly than it is transmitted through the heart. If then the heart is not soon roused to effort, the two venæ cavæ and the vessels immediately connected with them become filled nearly to bursting. Ordinarily the heart is roused by this state of things to extraordinary efforts, constituting what is called a reaction. But, frequently, in this disease that reaction does not take place.

We attribute this failure of the heart primarily to a diminution or depression of its powers, produced directly or indirectly by the poison which acts on the system. Hence will arise the anxiety at the præcordia, gradually proceeding to anguish. Hence the failure of the supply of blood in the arteries, hence its accumulation in the veins, or in the great organs of the thorax and abdomen.

But it is not the heart only, in which the powers are depressed by the morbific agent. The other organic functions fail as well as the circulation; and they fail not merely on account of the failure of the circulation, although the more for this. The secretory functions fail independent of the want of good blood. So also do the functions of digestion and no doubt all those of assimilation. The animal powers do not seem to be affected so directly in cholera, or certainly not all of them; and perhaps they suffer only indirectly; that is, because the animal organs are not duly supplied with good blood. The sensibility continues; or, where an organ of sense fails the failure seems referable to the imperfect or deranged circulation. This is the case with the deafness which accompanies the giddiness at the commencement of the disease. The intellectual functions are remarkably exempt from derangement in cholera, more than in the onset of violent or irregular fever. The muscular powers fail, but not the control of the mind. The mind can control the muscles to the extent of their ability to act; but the failure in the circulation lessens that ability and ultimately destroys it. The muscles, it is true, suffer violent spasmodic actions; but this inordinate action is quite consistent with diminution of power, as has often been noticed. Indeed so common are spasmodic affections, when the powers of life generally are the most reduced, that it has sometimes been thought that spasm arises only from debility. The occurrence of spasms in the voluntary muscles is a very common consequence or concomitant of irritation in the stomach and bowels. Antimonials, which produce a temporary cholera, very frequently occasion spasms in the limbs and sometimes in the trunk. And this happens when the muscular powers is peculiarly deficient from the influence of the mineral. For it is familiar to the surgeon that the muscular power is depressed by antimonials; and he accordingly brings them to his aid occasionally in reducing luxations.

We regard then the effect of the poison on the constitution to be a depression of the organic vital powers, so great as ordinarily to prevent reaction. The depression is an effect common to this and many other poisons. The failure in reaction is much less common though occasionally seen in other cases. This failure is shown principally in the heart. If that can be made to renew its functions even moderately, as will appear hereafter, the danger will be averted. Thus far the disease may be regarded as among the most simple in its character, though most direful in its consequences.

We have next to attend to the local effects produced by the remote causes. We say the local effects, although the failure of the heart may also be called a local effect. But that is to be regarded as the most prominent result of the depression of the organic vital powers.

The local changes wrought by the poison, which causes spasmodic cholera, are those of the alimentary canal. The effects there exhibited are those of a violent and overpowering agent, which produces, 1st, an inordinate, perhaps spasmodic, effort at once in every part of the stomach and bowels for the expulsion of their contents. Food or other substances in the stomach are suddenly vomited. Immediately afterwards, or sometimes before or at the same time, the fecal contents are expelled, so that the bowels are more effectually and briefly emptied than under almost any other circumstances.

2. A modification or suspension of the vascular functions in the mucous membrane and its glands. The regular secretions are suspended, and an exudation, as it may almost be termed, of the serous parts of the blood takes place into the canal. Some albuminous matter, the most important constituent of the serum, would seem to pass with the water and to undergo a partial change. This happens especially in the small intestines. The watery parts are rapidly expelled from the bowels, and in extraordinary quantities, but the more solid and cohesive matters are for the most part retained, sometimes nearly blocking up the duodenum and jejunum, as appears after death.

These effects on the alimentary canal are very similar to those of some narcotic poisons, especially of tobacco. Meanwhile the constitutional affections, the failure of the heart, the faintness and spasms also call to mind the remarkable effects of tobacco, when introduced into the stomach or bowels. Hence it might be supposed that the virus or miasmata, which produce cholera, must be applied to the stomach or bowels. But this is not certain; for, however introduced into the system, each poison when introduced, operates in the organs most susceptible of its influence, whether first applied to them or not. In this view of the subject it is not very important to decide to what part the poison is actually applied in the first instance.

Thus far we see the effects of a poison, which stimulates the muscular coat of the alimentary canal most violently and suddenly at the same time that it produces the depression already described.

There is one circumstance for which we must seek an explanation in spasmodic cholera, as at first view it seems to be peculiar to the disease. This is the absence of bile in the discharges. Is this owing to a failure in the secretion? The failure in the secretions generally might render this probable. But, if this failure be owing to a want of the supply of blood, we should not look for it in the liver. In consequence of the peculiar mode in which this organ is supplied, it does not suffer, any deficiency of blood in this disease, but rather a redundance. And, besides, though the secretions are not natural, there is an excess rather than a want of fluid furnished by the mucous membrane of the canal, with which the liver is immediately connected by situation, and in function. And in point of fact there is not a stoppage in the secretion of bile. It appears, after death, that sufficient bile has been secreted, the gall-bladder being found full and even distended with concentrated bile in most instances. It may be said perhaps that the liver is the only organ, in whose secretion there is not a failure, though there does not seem to be any excess in it; for the quantity found after death is not more, than may fairly be accounted for in a case, where the bile is not passed off for one or two days. There must then be some cause preventing the passage of bile through the common duct. What this is, does not clearly appear. But it may be observed on this head that the peculiarity is not perhaps so great, as it appears at first view. It is true that ordinarily, when there is any irritation in the alimentary canal, much bile is passed into and from it, just as the tears flow upon irritation of any part of the eye, or saliva upon irritation of the mucous membrane of the mouth. But the fluids do not always flow at once in these cases. There is often a period during which they are withheld, and then they are poured out in excess. Now in the case under consideration, the period during which the bile is withheld, is perhaps longer than usual, but not much longer. For, if the system rallies under the first shock, the bile does then flow; and its appearance is then hailed very justly as an evidence of relief, while it probably contributes also in some measure to promote and perfect this relief.

The failure of urine, which is owing more entirely to the constitutional affection than that of the bile, may be explained in a similar manner. The secretion ceases in this instance in a very great measure or entirely. But this is during the period of depression. If the system can survive the first shock, the

urine appears again. If in the severe cases it never appears, it is because the powers are entirely overcome under this shock.

In the non-appearance of both bile and urine in the spasmodic cholera, the peculiarity is in the length of time, in which this non-appearance continues. Probably in common cholera there is always a period, though often a short one, in which the secretions equally fail or are withheld. In spasmodic cholera this period is prolonged in accordance with the duration in the general failure of the organic functions, which constitutes indeed the most important feature of the disease.

Some of those who have attended to the phenomena in spasmodic cholera have attributed much to the change wrought in the blood. Some have attributed this change to the direct effects of the poison; others to the failure of the circulation, and the consequent failure of the changes wrought by respiration; or again to a diminution of the powers by which these changes are wrought, even though the blood is carried through the lungs. As one of the facts in the case, the change of the blood certainly merits attention.

The healthy and living blood, when in circulation, maintains a perfect fluidity in all the vessels, and varies in color in vessels of different descriptions. Under certain circumstances, of which rest is one, a portion of it coagulates, and then its parts separate. In this disease the blood loses this perfect fluidity, and it becomes darker than in health in all its vessels; even in the aorta and its branches. To produce these effects perhaps three causes conspire. First, the vitality of the blood, as well as that of the heart, may be directly or indirectly lessened by the poison, which produces the disease; second, the languid circulation and the consequent failure of the pulmonary changes may operate in some measure to effect the alteration; third, the great quantity of serum separated from the blood may explain much of the alteration noticed in it. We have not perhaps any means of deciding on the comparative influence of these causes; but we are disposed to believe that they all operate.

How far the imperfect blood operates to maintain the state of depression in the whole system is again a question of no small importance, but also of no small difficulty. Practically however we must regard the failure in the circulation as more important than the change in the blood. For it is certain that, if the circulation is restored to its wonted state, relief is obtained very shortly; and that sometimes happens sooner than any

change can have been wrought in the blood itself, unless so far as this is done in the lungs.

The diminished fluidity of the blood may be most readily accounted for by the loss of so large a portion of its serous parts, as is thrown into the alimentary canal. Its imperfect coagulation is referrible to its diminished vitality.

A depression or diminution of the nervous power, has been regarded as entering into the proximate cause of spasmodic cholera, if not as alone constituting it. An attention to the views of those, who advance this opinion, will show that it arises from a principle established in the minds of many, perhaps most respectable physiologists, but not as we think on sufficient grounds. This opinion is, that vitality belongs peculiarly to the nervous system, and that from this it is furnished to the other subordinate systems. Seeing in spasmodic cholera a depression or diminution of vitality, such physiologists infer that there is a diminution of nervous power. The two are in their minds identical. We regard this principle as entirely erroneous, but this is not a place to discuss it. Suffice it to say that in living bodies every organ should be presumed to possess the powers requisite for its own functions. The nervous system has to perform, 1st, the functions of sensations ; 2d, those subservient to the intellectual processes, and especially that of conveying the volitions to the organs of the voice and to certain organs of motion ; 3d, that of maintaining certain relations, not recognised by the mind, between the different organs of the body, especially between the great organic viscera and the parts for which they labor. These relations may be called sympathetic. It is because the influence, exercised through certain nerves, is so necessary for this last purpose, that those nerves have been supposed to distribute vitality to the heart, the stomach, and similar viscera. They do not distribute vitality ; but they keep these great organs in action by maintaining a connexion between them and the rest of the body. Plants and the more simple animals have no such nerves, and they have no great central organs requiring their influence.

If we inquire into the evidence of a failure of the nervous functions in spasmodic cholera, we find that, as a system, that which is called nervous, maintains its integrity more than any other. The only part, which may be thought an exception, is that which connects together the organic viscera. But it is the depression in the powers of these viscera themselves, which is the source of evil. Hence they cannot exercise any good

influence on each other, even though the nerves communicating between them possess their integrity in the fullest manner. That the fault is in the nerves has never been shown. If the failure were in the nervous system, as such, the senses and the intellect ought to manifest it, as well as the sympathetic nerves. But it is acknowledged that they do not.

Such are the views we entertain on this subject. We have thought this brief exposition of them necessary, as showing the grounds of our dissent from those, who seek for the proximate cause of cholera in the great ganglionic and sympathetic system of nerves.

How far may we suppose inflammation in the alimentary canal or elsewhere, to be among the primary effects produced by the morbific agent and consequently to enter into the proximate cause of the spasmodic cholera?

It is the fashion of the day to trace morbid affections of all kinds to inflammation, and to distinguish carefully the organs and textures affected. Under the influence of this fashion we find that not only the great viscera, but also the nerves, the blood vessels and the most minute parts are subjected to critical examination. We would not discourage these examinations, nor speak of them with disrespect. They are most valuable; and we are among the believers in the doctrines, on which they are founded. But pathologists are carried too far, when they persuade themselves that diseases must depend on inflammation in all cases; and when under this persuasion they consider the slightest traces of inflammation, as sufficient to account for the most grave, violent and mortal derangement of the functions. A morbific agent in disordering the functions may incidentally produce an inflammation in one or several parts. Shall we infer in every case where inflammation is discovered, however slight, that this must be the primary effect produced by the remote cause of disease, and that all the other derangement is secondary. Certainly not, when the inflammation is manifested in a part only, but not in all of the cases of the disease produced. Certainly not, when the inflammation is slight, while the disease is great. Certainly not, when the symptoms of the disease cannot be fairly traced to the local affection.

These remarks are applicable to the case before us. In the spasmodic cholera there are some symptoms which might well be attributed to inflammation of the mucous membrane of the stomach and intestines. These are, the distress in the epigastrium, the sense of heat in the same and in the other regions of

the abdomen, the irritability of the stomach and bowels, and the violent efforts of those organs without the presence in them of any known stimulus possessing extraordinary power. The constitutional affections might also be supposed to be produced by this local disease. But if this were the true state of the case, we should presume that this inflammation must be of the most violent character and of great extent. We could hardly else account for the severity of the symptoms, for the frequent fatality of the disease and for the rapidity of its termination in death. Should it be said that the poison producing the inflammation had a peculiar power; that, without causing much visible inflammation, it might cause a most deleterious influence on the system? If this be admitted it is plain that it is not the inflammation which causes the disease, but the poison operating an injury of another kind. The disease can no longer be said to depend on inflammation, as its proximate cause.

But what do we learn from the appearances post mortem in cases of cholera? We learn that sometimes there are distinct marks of inflammation in the mucous membrane of the alimentary canal, and often slight traces of it; and that sometimes there are evidences of inflammation in the brain or spinal marrow; but that frequently no marks of inflammation are found in any part; and that ordinarily there are none of grave or severe inflammation. On this point the evidence is very strong and we are ready to acknowledge that it leads to conclusions, which are in contradiction to our own early prejudices.

Attempts have been made to show the existence in this disease of inflammation in the spinal marrow and in the nerves which supply the heart and the abdominal viscera. But these attempts have utterly failed. It is true that the spinal marrow has been found softened in some instances; but in others it has been found perfectly sound. Hence this morbid change cannot be considered as essential to the disease, and therefore cannot be looked to as the proximate cause.

We conclude then that the morbid changes in the spasmodic cholera, the effects of the remote cause, and constituting the proximate cause of the disease consist in —

1. A depression of those vital powers by which the organic functions are maintained.

2. As a consequence of the first, a failure, uncommon in its degree and in its duration, of the circulation of the blood.

3. A failure in all the functions of the system, more or less rapid, until life is extinguished in the fatal cases; the failure

in the organic functions, other than the circulation, resulting from the first and second circumstances jointly ; that of the animal functions from the second alone.

4. An extraordinary and violent excitement of the muscular coat of the alimentary canal, the direct effect of the remote cause.

5. An extreme irritation of the mucous membrane, likewise a direct effect of the remote cause ; which irritation passes to inflammation, if life be not destroyed by the first impression of that cause. This last cannot perhaps be regarded as a necessary circumstance, but rather as an incident very common in the disease.

It may be added that the inflammation, often noticed in the brain and sometimes in other organs, is still more decidedly an incidental and not a necessary part of the disease.

If it be said that this view of the proximate cause leaves much to be desired ; that it does little else than express the actual changes witnessed by the observer ; we reply that the same is true in regard to all our explanations in physiology and pathology when they are just and true. We add that it is useful to decide whether this disease consists in inflammation of one or more organs, as has been supposed by many pathologists. Our opinion is that it does not. For the rest, we fear it is the simplicity of our explanation and the exact expression of all which our limited discoveries can furnish, which will be regarded as most objectionable. The objections however will not, we trust, be urged by those who are accustomed to the most strict observation and the most exact logic.

VI. On the Diagnosis.

After the full description which has been given of the spasmodic cholera, as it has appeared in Asia and Europe, it may seem unnecessary to say much on the diagnosis. Generally there is not any difficulty in distinguishing from other diseases a case of cholera, such as occurs in our own climate. It may not however be possible always to distinguish that, which is produced by the circumstances of the season, from that which is produced by some acrid or stimulant substance taken into the stomach, except by attending to the previous history of the patient. Nor would it be easy to distinguish a single case of violent cholera of our own climate from that epidemic disease, of which we have been treating. It is the circumstance of its

being epidemic, or of several such violent cases occurring within a short time in the same place, which must decide the question, more than any particular symptoms which can be pointed out.

In general it may be said, that, in addition to the epidemic character of the disease, the spasmodic cholera of Asia is marked by the suddenness of the attack, the recession of the blood from the surface and the extremities, the livid or blue color of the parts not quite blanched, the anguish at the pit of the stomach or about the heart, and the spasms in the limbs and trunk, together with a vomiting and purging, in which bile is not discharged, at least not in the commencement of the disease, and the suppression of the secretion of urine.

In the quotation, which we made from Mr Bell's work on cholera relative to several stages of the disease, the last paragraph gives the symptoms, which he considers most characteristics, and therefore diagnostic as to this malady. It may be well to add the remarks of Mr Scott on the diagnosis, as given us by Mr Kennedy.

'Diagnosis. — The diagnosis in cholera is seldom involved in any considerable difficulty or obscurity. The most important distinction is that between the two species of cholera — the cholera biliosa, and the cholera asphyxia, especially that form of the latter, which is primarily attended with symptoms of excitement. Where the evacuations are tinged of a yellow or greenish hue, where the matter vomited is bitter to the taste, while the skin remains warm and the pulse good, the disease may be regarded as bilious cholera, commonly so called; but where, after the first emptying of the primæ viæ, the evacuations are of a watery consistence, colorless, turbid, or white; when no urine is voided, where the surface becomes cold, where the features are collapsed, where the spirits are greatly depressed, and where the pulse quickly flags, the case may almost certainly be regarded as cholera asphyxia. As the disease advances, the cessation of the pulse in the arteries of the extremities, the shrivelled and corrugated skin of the hands and feet, the restlessness, deafness, and general depression, leave no doubt of the nature of the disease. Many affections denominated nervous, such as syncope, cholic, hysteria, dyspepsia, spasm of any kind, and the cold stage of fevers, are apt, during the prevalence of cholera, to create an alarm of it. * * * Cases of cholera sometimes, apparently, commence by an insidious diarrhœa; or supervene on the action of purgatives, especially saline purgatives, and are then exceedingly apt to be mistaken, both by the patient and his physician. All the experience which we have yet had leaves the mind much in doubt

whether this diarrhœa be a primary symptom, or merely indicates a predisposition to the disease. The same observation applies to the effect of purgatives. In such difficult cases much may be inferred from the state of the epidemic influence prevailing at the time. If cholera be prevalent, they will generally attract immediate notice, and it is the safest course to treat them as cholera; but many of our most lamented casualties have happened from seizures of this description, which were solitary, and altogether unsuspected by the sufferers till too late. There seems, however, to be something peculiar to cholera, in blinding the patient to the real nature of his case: or perhaps conscious of the tendency of some of his symptoms, he seeks to repress the conviction, and is unable to admit or believe that, with little sensible disturbance of health, he already stands on the verge of his grave.'*

The following passage from the same source also relates to the diagnosis, though not under that head.

'Of all the symptoms of cholera, none is so invariably present — none, indeed, so truly essential and diagnostic, as the immediate sinking of the circulation. It must, nevertheless, be admitted, that, where instant remedial measures have been successfully practised, this symptom may not have developed itself; and that there are even cases where an excited vascular action has been observed to accompany the first movements of the system in cholera. Some intelligent practitioners have entertained doubts whether such cases belong indeed to this disease; and there seems reason to imagine that those inflammatory affections with spasm, known in this country, and alluded to in several reports, may, in some instances have been mistaken for it. It is further to be remembered, that these are precisely the cases which yield most certainly and readily to our remedial means; and it consequently follows, that a medical man can seldom have the opportunity of observing whether or not this form of cholera will degenerate into the low stage. There is, however, direct evidence in support of the fact, that they have so degenerated, and gone on to a fatal termination.'†

VII. On the Prognosis.

The actual hazard of life in the spasmodic cholera has been found to vary at different periods and in different places; likewise in the same place it has been shown to be greater

* Kennedy on Cholera, pp. 279, 280.

† Kennedy on Cholera, pp. 269, 270.

on the first appearance of the disease than subsequently. It is greatest in those individuals whose constitutions are most feeble, and in those whose habits of life have induced debility. The hazard is always great where an active treatment has not been immediately adopted. Where this has been done the fatal cases, by some of the best India reports, have been from one in ten to one in fifty perhaps. Where it has not, they have often been from five to nine tenths of the whole number affected.

In forming a prognosis in individual cases the following observations, from a careful and enlightened observer, will be found useful.

'The symptoms by which the practitioner may with propriety be led to hope that the disease will terminate favorably, are an increase of the strength and fulness of the pulse, a return of warmth to the extremities, and an increase of heat on the surface of the trunk; less frequent calls for drink, and a diminution of the burning sensation in the epigastric and umbilical regions; diminished urgency, or cessation of the spasms, vomiting and purging; the appearance of bile in the motions, and an inclination to void the urine, and still more particularly, if any quantity be voided; an improvement of the countenance, and a return towards the healthy appearance and functions of the skin; a more natural respiration, and an increased warmth of the air which is expired by the patient; an inclination to tranquil sleep, or a more lively aspect of the eyes; a ruddier or livelier appearance of the lips, tongue, and mouth; and less general uneasiness and restlessness. If, on the contrary, the symptoms mentioned in the description of the disease increase rapidly, notwithstanding the means of relief which have been adopted, and the functions of respiration become either very unusually slow and oppressed, or very quick and laborious, as if the patient were gasping for breath; and if the action of the heart be so greatly diminished as not to occasion pulsation in the extremities; when the features are sunk and collapsed, and the tongue and mouth become cold, and the breath occasions a cold and raw impression; and when the cornea begins to sink, and jactitation to be constant, the spasms, vomitings, and purging, at the same time to cease, we cannot hope for the recovery of the patient. The vital energy has then sunk so low, owing to the impression of the cause of disease, and to the more immediate effects produced thereby upon the nervous system, and upon the blood through the medium of the lungs, that it seems beyond the influence of medicine to restore it.'*

* Annesley's Sketches of Diseases in India. pp. 42 — 44.

These remarks correspond with those of various other observers. It may be added that in some of the worst cases there is little vomiting and purging, and even an absence of spasms; the depression of vitality seeming to be too great to admit these painful struggles.

VIII. Treatment.

The proximate cause of the spasmodic cholera, or the actual morbid state of the body under it, may not have been properly deduced. But it seems certain that the first great danger in the severe cases of the disease, arises from the failure in the circulation of the blood; from the crowding of this fluid upon the heart, in the great vessels about it and in the organs most closely connected and in proximity with it. The danger from these sources may be increased by the diminished fluidity of the blood, arising from the diminution of its watery parts. The second great danger arises from the tendency to congestion and inflammation in the internal viscera, particularly the brain, and the consequent effusion of serum or lymph.

As of inferior consequence, though of no small magnitude, may be mentioned the tormina and distress in the alimentary canal, and the accumulation of crude matters in it, derived from a hasty secretion or effusion from the blood vessels.

The indications, which are furnished by a consideration of the dangers thus pointed out, are as follows.

1. To remove the obstacles which exist to the free action of the heart, so that the more equal and vigorous circulation of the blood may be effected.

2. To excite the heart, and whatever other organs are concerned in maintaining the circulation of the blood, to vigorous and steady efforts for this purpose.

3. To equalize the distribution of the blood, and to overcome any excess in the violence of the actions of the heart, if that should ensue, so as to guard against internal congestion or inflammation.

4. To quiet the inordinate actions of the stomach and bowels and to relieve the pain in those organs.

5. To promote the flow of bile into the intestines and the discharge of the crude matter collected in them.

These seem to us to be the indications, which we must follow in treating the grave and severe cases of this disease. In the mild cases, in which there is exhibited principally a de-

rangement in the alimentary canal; and in the sequelæ of the more formidable disease, the treatment should be founded in principles sufficiently familiar. These need not to be distinctly and formally stated.

Keeping in view the several indications which have been laid down, a method should be adopted which should correspond as far as possible with all of them, while the two first, which are most important, should engross the most constant and most immediate attention.

To fulfil these two first indications, it may be sufficient to employ stimulants on the surface, and introduce them into the stomach. These, by their irritation, would determine a flow of blood to the extreme vessels near which they would be applied, and at the same time influence the heart by sympathy to impel the blood with increased force from the centre. But in the depressed state of the heart, stimulants are not found sufficient to enable it to overcome the obstacles which usually gather around it, before an opportunity is afforded for the assistance of art. At least, this is true in the severe cases. It therefore would be necessary at the same time to diminish the volume of blood, by which the first indication would be more immediately fulfilled. In other words, if the distribution of the blood can be equalized by stimulants, both the two first indications would be fulfilled. If it cannot, the mass which is to be moved must be lessened, so as to facilitate this equalization. In this view it is plain, that remedies which seem at first view incongruous, may be very properly employed at the same time, viz. stimulants and blood-letting.

By some persons in this country it will be thought, that blood-letting in cholera is recommended by theory, and not from experience. It is not so. On the other hand, objections to bleeding are made by those who have not tried it, or who have tried it imperfectly and timidly; while almost every man in India, who adopted the practice to such an extent as to qualify him to decide on its value, became an advocate for it. It would add a hundred pages to this report, if all the evidence in support of this last assertion were to be brought forward here in detail. The following extracts will enable the reader to form some judgment on this subject.

We have frequently referred to the reports from the three presidencies in India, viz. that of Bengal by Mr Jameson, that of Madras by Mr Scott, and that of Bombay. Our first quotations will be from these.

In the Bengal report, by Jameson, we find that a large proportion of the individuals whose practice is stated, recommend bleeding, and some of them in very strong terms. The severity of the epidemic in the centre division of the army, under the Marquis of Hastings, in 1817, is very generally known. The first extract relates to the practice in this division.

'We now come to the centre division of the army, where the disease was seen on the largest scale; and each remedy was brought to the full test of experience, by numerous and repeated trials. Here, therefore, it will be necessary to be somewhat more particular, than we have been, while speaking of the other corps of the army. When the disorder first fell upon the camp, in so insidious a manner, as to lead to no suspicion of the dreadfully epidemic form it was soon to assume, the cases coming under observation were comparatively mild; and were treated successfully with calomel, opium, and brandy, in moderate doses, at regular periods. But, as the symptoms increased in intensity, this plan frequently failed; and it became necessary greatly to augment the quantities of these medicines. At length, even the largest doses of stimulants proved useless; and the miserable sufferers were cut off, in spite of every means, after an hour or two of illness. The bodies of some of the Dooly bearers, and natives, were then opened, and such inflammatory appearances discovered, as seemed to warrant a new mode of treatment. The lancet was accordingly had recourse to; but as, at this period, the patients were almost all natives, seen at an advanced stage of the disease, and in whom universal coldness and collapse had usually taken place, it was rarely found that the blood would flow; and the practice was soon abandoned in despair. Then, brandy and other cordials were freely given, to raise the pulse, and remove debility; and large doses of laudanum, to relieve spasm; but still almost all died.

'Whilst the practice was in this unsettled state, and the medical officers were in extreme suspense, as to the proper means of resisting the disease, the European portion of the army began to be attacked. About 5 A. M. of the 14th of November, two Europeans belonging to the flank battalion were admitted into the hospital. They had the disease in its most violent shape. The spasms especially were tremendous. A scruple of calomel, and one hundred drops of laudanum in a glass of brandy and water, were given to each of the sufferers, and repeated at intervals during the day; but without the least relief. They continued in horrible torture; and died before eight at night. During the course of the same evening, four men of the same corps were admitted together. It was resolved to try bleeding on all. From two no blood could be obtained; but from the other two it came

freely ; and as it instantly relieved the patients, thirty ounces were taken from each. Next morning of these men, the two latter were out of danger ; whilst of the former, one was dead, and the other expired before noon. Emboldened by the successful results of this trial, the medical officers of the flank battalion from this time endeavored to bleed every one taken ill ; and with one solitary exception, no person thereafter died, from whom twentyfour ounces were obtained. If the patients were seen within two or three hours from the beginning of the attack, the practice usually succeeded ; but at a later stage, when the pulse was gone, the skin cold, and the nails blue, no means could make the blood flow. Sometimes, even in the commencement of the attack, the attempt was ineffectual, from the extreme violence of the symptoms.

'About the same time, a similar modification of treatment was adopted in the artillery hospitals. From the ill success that attended its employment amongst the native details, venesection was for a few days laid aside. But, as it soon appeared, that all other means were unavailing, it was shortly again had recourse to among the Europeans ; and from that time forward, not a patient was lost, except one from whom only a few ounces of blood could be drawn. Whilst the blood was flowing, the patients generally expressed themselves to be much relieved ; the spasms instantly abated in violence, and in many cases, totally disappeared on a second bleeding. Sound sleep frequently ensued ; and after a few hours, the patient awoke refreshed, with scarcely an unpleasant feeling remaining. From eighteen to twentyfour ounces were always taken on admission ; and the operation was repeated to the same extent, if the spasms did not yield, after an interval of three hours. In some instances, it was had recourse to, even four or five times in twelve hours ; the quantity of blood taken away being solely regulated by the symptoms, without attention to the state of the pulse, which was generally weak and frequent. Some of the Europeans lost more than five pounds within twentyfour hours ; yet they did not appear to experience a greater degree of debility from this extent of depletion, than those who had not lost half the quantity.'*

The second extract gives the general results of the experience as to remedies tried in Bengal, and among the rest of bleeding. Its temperate language must recommend it to men of good judgment.

'A deliberate review of the whole of the preceding remarks, on the modes of treatment pursued by different individuals in combat-

* Jameson on Cholera Morbus, pp. 235 – 238.

ing the disease, and a careful comparison of the results of opposite lines of practice in the several divisions of the army, would seem to authorize the following conclusions.

'1. The disease sometimes attacked with such extreme violence, as from the commencement, apparently to place the sufferer beyond the reach of medical aid, and to render every curative means employed equally unavailing.

'2. The difference in the degree of mortality amongst those, who did, and those who did not take medicine, was such, as to leave no doubt, that, when administered in time, and with discrimination, it frequently saved the patient from death.

'3. The chances of a patient's receiving benefit from medicine, diminished in proportion with the increased duration of the attack.

'4. In Europeans generally, and in robust natives, bleeding could commonly be practised, where the patient was seen within one, two, or perhaps three hours, from the beginning of the attack; and in all cases, in which it was resorted to, under such favorable circumstances, it was more successful than any other remedy, in cutting short the disease; usually resolving spasm; allaying the irritability of the stomach and bowels; and removing the universal depression, under which the system labored.

'5. Amongst the generality of natives, the depressing influence of the disease was so powerful and rapid in its operation, as almost immediately to produce complete collapse, and nearly destroy arterial action; and therefore, to render venesection, for the most part, from the beginning, impracticable.

'6. In such cases, the cure was best attempted by diluents, powerful anodynes, and stimulants; combined with calomel; and followed up by mild laxatives, and tonics.

'7. Although it cannot be affirmed, that calomel possessed any specific power in checking the disorder, it was undoubtedly frequently useful in soothing irritability; and was perhaps, of more certain sedative operation than any other medicine.'*

With the Bombay report we are acquainted only at second hand. From the works which refer to it, we learn that the reporters were generally in favor of blood-letting in the cholera. From Dr Burrell, whose report is contained in this work, we derive the following, which has been quoted in various works. 'Of the cases admitted of cholera since the 21st ult. (July) to the 10th August (1818) the casualties run thus,—

Bled	88	Dead	2
Not bled	12	Dead	8
Total admissions	100	Deaths	10'

* Jameson on Cholera Morbus, pp. 245—247.

It is not to be understood, that results equally favorable were obtained in all instances.

Mr Kennedy gives us abstracts from the reports of thirtyfive practitioners, a large proportion of whom belonged to the Bombay presidency. Of these, no one gives an opinion against bleeding in cholera. Twenty say nothing respecting this practice, and only three or four of these twenty speak of the treatment at all. Fifteen speak of the effect of blood-letting from their own experience. Every one of these commends the practice, and most of them in very strong terms. As an instance of the last kind, and as affording a numerical statement, we shall quote the report of Mr R. Orton, Surgeon, Bellary, Oct. 8. 1818.

'I am extremely happy to have it in my power to bear testimony, in the strongest terms, to the efficacy of blood-letting in the treatment of cholera. In four cases it failed, but in all these the severe symptoms had been established, from five to thirteen hours before admission. In thirtytwo others I have seen bleeding followed by rapid cures, though in fifteen of these the second stage had commenced. In none has it been unsuccessful when applied before or soon after the commencement of that stage.'*

We shall add Mr Kennedy's own testimony on this point. It should be stated, that Mr K. witnessed the disease in India.

'The character of venesection has been libelled in a peculiar manner. At an early period, during the progress of this singular malady, the blood deserts the superficial vessels of the body, for the deep-seated and internal parts, and even before the period has arrived in which a loss of blood could prove injurious to the patient, not a drop of that fluid can in general be procured, after the opening of both veins and arteries. In ninetynine instances out of a hundred, where patients are said to have died "despite of blood-letting," it will appear, upon examination, either that no blood flowed from the incised veins, or that it came away in drops, or in a small broken stream, rarely exceeding a few ounces in quantity. On the contrary, where blood was freely obtained to the extent of twenty or thirty ounces, and where the depletion was followed by proper auxiliaries, the patients have usually recovered.'†

As the Madras Report, by Mr Scott, is spoken of with peculiar respect by all who have seen it, we are glad to have an opportunity of adding the full quotations below. They are

* Kennedy's History of Cholera, pp. 103—104.
† Ibid, pp. 168, 169.

taken by us from Johnson's Medico-Chirurgical Review for 1825.

'The abstraction of blood, unless as an anti-spasmodic, is a remedy so little indicated by the usual symptoms of cholera, that its employment in the cure of this fatal disease has afforded a signal triumph to the medical art. It requires no common effort of reasoning or reflection to arrive at the conclusion, that, when the powers of life appear depressed to the lowest degree, the pulsation of the heart all but extinct, the natural heat of the body gone, and the functions of the system suspended and incapable of being revived by the strongest stimulants, the abstraction of blood might yet prove a remedy against a train of symptoms so desperate. Bleeding was, no doubt, first employed in cases where there was much spasm, and where the powers of the system had not much declined: the relief was generally obvious and immediate, and the practice in such instances was thus established. Dissections having frequently shown a loaded state of the vessels of the viscera, and apparent inflammation of their mucous membranes, venesection was also adopted to obviate these conditions, and naturally enough: but the employment of blood-letting, without reference to either of these states, and as a remedy for collapse in cholera, must have been the result of reasoning and reflection, founded on the general principles of the science; a result highly honorable to the profession; and, as we shall endeavor to show, of the utmost practical importance in the cure of the disease.

'We have no precise information regarding the manner, in which venesection was performed in general; although, in such a disease, this seems a matter of very considerable consequence. It is remarkable, that in a disease like cholera, syncope should be so rare a symptom. When it is brought on by venesection, it is generally favorable, which may most probably be imputed to its being employed during violent spasm, and before any sinking has taken place. We can then readily understand, that the free evacuation of blood, which may be supposed to precede the syncope, as well as that state of relaxation itself, will be followed by amendment: but there is no information, which can lead us to believe, that syncope has often followed the abstraction of *small* quantities of blood, or that success had followed small bleedings. The usual expression is, that after a scanty discharge of blood, it ceased to flow, and that depression of pulse, with *faintness*, not *syncope*, came on, or was increased. We are not informed, whether bleeding has been generally performed in the recumbent, or half erect posture. It is evident from the reports, that the mere act of elevating the body has been followed by faintness and even death; and if venesection has been often attempted in the half erect posture, we may thence account, in

some measure, for the frequent want of success in obtaining blood.

'Few remedies, on a fair trial, have been more generally and unequivocally advocated than free blood-letting: and the most that has been urged against it is, that it is not always successful. The advocates for bleeding proceed, however, on the principle, that a certain quantity of blood is to be obtained, in order to insure success, which few of them estimate at less than about thirty ounces. Those, who are disposed, either less favorably towards bleeding, or to condemn it altogether, object, that if the circulation is in a condition to admit of free bleeding, the case is a mild or favorable one, and would probably yield to other remedies. There is no doubt, that fatal collapse has sometimes suddenly followed, even *large* bleedings, which has staggered the faith of many practitioners in the general safety of the remedy; but in the great majority of cases, it is after *small* bleedings that this has happened. There is the most ample evidence also, that cases, especially in Europeans, even under the most favorable appearances, will often, in spite of all internal and external remedies, go on to a fatal issue, when bleeding is not practised.

'The cause of collapse coming on after, or during bleeding, in cases of cholera, may perhaps be explained, so as to obviate the objections thence arising against it as a remedy in that disease. It seems unquestionable, that the evacuation of a small portion of blood, such for instance, as we might suppose to be yielded by the remoter branches of vessels, is followed by increased debility: but if we succeed in carrying on the evacuation, till its effects reach the internal vessels and the heart itself, *then* the circulating system seems to be freed from an oppression which impeded its functions, and it becomes equal to the task of propelling the mass of blood. This is a species of indirect excitement. The powers are not raised, but the resistance, or weight, is lessened. Such is the theory, which has been adduced in support of blood-letting in cholera. The reader will be aware, that it is not new; its application to the particular disease, of which we are now treating, being the only novelty. *If the theory be true, the presence, or the supervention of collapse, so far from deterring us from going on, should only be regarded as additional reasons for renewing our efforts to get blood.*'

'In proof of this, a great many testimonies are brought forward, drawn from the journals of medical officers, after which Mr Scot goes on thus:—

'Besides the very ample evidence, which will be found in the printed reports, in favor of blood-letting as a remedy in cholera, the opinions of the majority of medical officers whose observa-

tions are not inserted, are also decidedly in its favor. The objection chiefly urged, is not against the practice, but rests on the too frequent impracticability of procuring a sufficient quantity of blood. It is acknowledged, even by the most zealous of its advocates, that this difficulty has often occurred, and proved insuperable. When, however, the operation is performed with the moral conviction, that, if successful in obtaining blood, the life of the patient will most probably be saved, the operator will persevere, undiscouraged, in his efforts: he will call in every suitable aid, such as frictions, bathing the arm in hot water, reopening the orifices of the vessels, administering stimulants, and external warmth. He is not deterred and induced to desist by any intermediate accession of debility, or collapse; nor, is he tempted to rest satisfied with any temporary melioration of pulse: his object goes beyond the present moment, and he feels satisfied, that if he can fully unload the internal vessels, he will save his patient, and if he fails, that he will most probably lose him. It is not considered to be of much importance, whether the patient may have been bled before or not, if his present symptoms indicate a repetition of the operation. The principle is, that collapse, in cholera, is not the consequence of the loss of blood, but is a condition which nothing but its abstraction can be trusted to for relieving. In the second case, however, when the medical man is not decided in his own mind, obstacles will be allowed to subdue his fortitude, and arguments will be thence deduced to dissuade him from perseverance. A sudden aggravation of the symptoms of collapse will be regarded as an effect of a remedy, at least doubtful; or, a transient return of vascular action will be held, either as a sufficient advantage gained, or as an indication that bleeding is no longer required. It is thus we may account for a vast number of ineffectual, because undecided attempts at blood-letting; and for a vast number of unsuccessful results, when the quantity abstracted falls short of that which is required: for the volume of the blood must be reduced in a given proportion, in order to secure the effects expected from it. Anything short of this will only take away from the patient's strength, and not augment the motive powers of the circulating system; or, what is the same thing, will not diminish the resistance to the motive powers.

'Cholera is unquestionably a very dangerous disease, and so many circumstances concur in aggravation of its natural fatality, that we can scarcely hope that any mode of treatment will ever be devised which shall strip it of its formidable character. Much injury has arisen, however, from remedies being brought forward, and tried, as if they were absolutely specific and infallible. And amongst others, blood-letting has been put to this most unjust and unphilosophical test. If strictly considered, it would, perhaps, be

the least of all entitled to the appellation of a specific remedy; for in truth, there is great reason to doubt, whether it be directly curative of the essential symptoms of cholera. Its warmest advocates only consider it as an auxiliary, and never trust to it, but in combination with other, and which indeed appear to be, the strictly appropriate remedies. Congestion, for which alone it is indicated, appears merely to be a symptom or consequence of that morbid state, which forms the first and highest link in the chain of cholera actions. The removal of congestion, which is mechanical, allows the heart to respond to the action of the other remedies. Should it be objected, from a consideration of some dissections, that no particular congestion had taken place, the blood appearing to be equally diffused over the vascular system; and that in some instances, the circulation, though ultimately affected, seems to retain its powers for a time, without material depression, yet, even in such cases, venesection, by lessening the volume of the blood, may still have beneficial effects. We should certainly apprehend no danger from it in cases of this description, used, *as it ought invariably to be, in conjunction with the other remedies.*'—pp. 138–141.

Lastly, we should add, that both Mr Annesley and Mr Bell, whose works we have quoted, and who had abundant experience in the treatment of cholera in India, regard blood-letting as the most important part of the treatment. It is not intended to say, that they recommend this practice as a specific, at any stage, and under any circumstances. But they recommend it very generally, if the patient is seen in the early stage, and occasionally at a late stage.

'Upwards of fifty men were landed from the General Harris, Indiaman, under the disease, and sent to the general hospital; and it is with peculiar satisfaction I can say, that the whole number returned in health to that ship before she left Madras Roads.'

'Nearly all the men who were attacked with this disease on board ship, and who were not bled, or from whom blood could not be drawn, died. Many of those who were bled, and who derived benefit, but whose subsequent treatment could not be closely watched from want of means, also died. Those men who were bled, and sent to the general hospital at Madras, where they could receive every attention, and had every means of accommodation, recovered.'*

The same practice is commended by many of the most ju-

* Annesley's Sketches of the Diseases of India, pp. 172--173.

dicious and enlightened physicians of Europe. But it does not appear that it has been carried to the same extent, generally speaking, in that quarter of the world as in Asia. Whether the want of boldness in this respect has been the result of experience, does not very clearly appear. We certainly have not met with distinct statements from any European physician, so favorable to this mode of depletion, as those which we have quoted from the Anglo-Indian practitioners. It is equally true, that the results of medical treatment generally, in Europe, are less flattering than those in India.

Upon the ground on which the bleeding is proposed, it would appear that this must be effected from a vein, not from an artery, nor from the capillaries. This is particularly pointed out by Mr George H. Bell, in the very luminous and philosophical work on cholera from which we have already quoted. He assures us that experience supports his view of the subject in this particular. If blood be taken from an artery, we subtract from that small stream, which the heart is sending out through the aorta. If taken from a vein, we draw off what would otherwise be added to the large veins, already over-distended. If blood be drawn from the small vessels, by leeches or cupping, the large veins will be very little relieved, while the fluid is taken from the very vessels which need a supply.

If now we look to the third indication, it will be plain that it will be fulfilled by the measures already pointed out. It might be necessary in addition to employ counter irritation, in a powerful manner, in the vicinity of the head, or other part, in which the symptoms should discover the existence of congestion, or still more if of inflammation. It might also sometimes happen, that when the first danger had been overcome, the force of the circulation, together with marks of internal inflammation, would call for blood-letting, upon the principles on which this practice is more commonly founded. But instances of this kind are probably rare. So at least we are led to believe, by those who have been conversant with the disease. They do, however, sometimes take place.

Emetics are among the remedies which may be thought to be adapted to fulfil the most important indications in the treatment of spasmodic cholera, and especially the second and third which we have laid down. Full vomiting frequently has the effect to rouse the heart, when languid; to equalize the circulation; and to open all the natural emunctories. In the commencement of fever, we sometimes produce the most satisfac-

tory results by emetics, where the benefit does not appear to arise from the matters evacuated, but from the modes of operation above described. If the substances, which we call emetics, would always produce full vomiting, and do it readily, they would seem admirably adapted to the treatment of cholera in the commencement of the disease, and even in the state of collapse. But unfortunately these substances frequently cause long continued nausea, and perhaps retching, without full vomiting, and this especially in a torpid state of the organic system. Likewise these substances, accumulated in successive doses, occasionally pass into the bowels, and produce hypercatharsis. These inconveniences are a deduction from the advantages of emetics in common diseases; but in one which often gives only a few hours for the use of remedies, and in which there is no time to correct a wrong step, they are very serious objections.

Probably it was from these considerations, that very few practitioners in India employed emetics to any great extent in the treatment of cholera. Some of them, however, did try remedies of this class, and the reports from a limited experience were more favorable than might have been anticipated.

In Europe, the disease would seem to be less frequently rapid in its course, than in India, and is preceded in very many cases by diarrhœa, or other premonitory symptoms, for a day, or even two or three days. Under these circumstances emetics have been tried, and seem to have acquired more favor than in India. But the articles used in Europe are not those which generally stand first on the list of emetics. Two articles are especially recommended. One is common salt, the other is mustard-seed in powder. This last appears to be a favorite article in Great Britain at the present time; so much so as to have led to some controversy as to the invention of the practice. Three teaspoonfuls of the mustard are mixed with half a pint of hot water; and the whole is to be given as speedily as the stomach will permit. It is in the state of collapse, particularly, that this remedy is thought appropriate.

To fulfil the fourth indication, a different set of remedies would seem appropriate. These are narcotics, of which opium is the most important; to which may be added those articles commonly regarded as sub-tonics, but which operate to diminish inordinate sensibility and irritability. But these very articles, by diminishing distress and suffering, and perhaps by some other mode of operation, are found to promote a free and

easy circulation in cases such as we are considering. Meanwhile, whatever produces a more vigorous and equal circulation of the blood, will indirectly relieve the sufferings of the stomach and bowels. So that there is not any objection, but an advantage, in employing opium in connexion with the remedies already proposed. This may be done in different modes and forms. It may be introduced into the stomach or into the rectum. It may be employed in the solid form, or in some liquid preparation. The latter is to be preferred, generally, because its influence will be most immediate. It has not been noticed, so far as we know, whether any advantage is to be derived from the use of morphia and its preparations, more than from the common preparations of opium. The trial of the morphia would be advisable. How far other narcotics may be substituted for opium, does not seem to have been ascertained by experience. The Hyoscianus should, we think, be subjected to experiment. Of the sub-tonics referred to, the subnitrate of bismuth is probably the best, and this has been tried and much commended. It is not, however, to be regarded as anything more than an aid to more powerful remedies.

To fulfil the fifth indication, cathartics are called for, but not any cathartic indifferently. Those are wanted which act most effectually on the upper portion of the intestines, and thus induce a flow of bile. For this purpose mercurials are to be preferred, though these may be followed by some of the quicker purgatives. Mercurials are more valued in this case, from a belief that directly or indirectly they aid in promoting an equal distribution of the blood, when that is requisite. To effect this suddenly they must be given in large doses. This has been urged the more, because the submuriate of mercury has been thought, when given in large doses, to diminish the excessive irritability of the stomach. It is not very important, in a practical view, whether it produces this effect directly, as bismuth is supposed to do ; or indirectly, by determining downward the action of the stomach and bowels, or by promoting the more natural secretions of all the abdominal and other viscera. If numerous reporters have not been misled by theory or fashion, experience justifies the use of the submuriate of mercury, in doses of ten to thirty grains, in the treatment of this disease. This article too may be given at the very commencement of the treatment, and at the same time with those which have already been mentioned, as remedies of prime necessity. This last consideration is of great importance ; for in a disease which often runs its whole

course in a few hours, and in which the life of the patient may depend on the proper use of every minute, it would be of little avail to direct many remedies, if they could be employed only in succession and at distant intervals.

We proceed to point out more distinctly the exact method to be pursued, and to state the value of the different remedies, so far as we are able to estimate them, in the different forms and circumstances of the disease. In thus doing we shall point out the course which is sanctioned by experience. But we shall not think it necessary to discuss every remedy which has been proposed and urged upon the public.

At the first seizure the patient should be placed in bed, and subjected to strong friction, while remedies are prepared. Articles should be employed to communicate heat to the surface, and it is better that these should be dry than moist. Bags containing hot sand, ashes, salt, meal, or any more convenient articles at hand, should be applied to the limbs and to the sides of the body. Bottles of hot water may be employed in the same way, especially at the feet. Mustard poultices should be applied to the pit of the stomach, and extended over the abdomen. They may also be put on the feet, and any other part which is peculiarly cold, or painful. A stimulating liniment may be used for rubbing the surface, as soon as it can be procured. This may be prepared as follows, or varied in the proportions according to circumstances.

℞. Pulv. Camphor, ʒ iv.
Aq. Ammoniæ, f. ℥ j.
Ol. Oliv. }
" Terebinth, } aa. f. ℥ ij.

Meanwhile the patient should take a full draught for once or twice of warm water, of gruel or chamomile tea, unless he spontaneously clears his stomach of all food by vomiting. If there be great sinking and coldness, the mustard emetic may be tried. But as soon as the stomach is cleared, or sooner if the pain or distress at stomach be urgent, he should take a hundred drops of tincture of opium (laudanum) in some hot water with tincture (essence) of peppermint. So much may be done without waiting for medical aid. But in all cases it is proper that this aid should be obtained as speedily as possible.

As soon as the state of the stomach offers any chance of its being retained, a full dose of the submuriate of mercury (calomel) should be given in powder. If rejected, this should be repeated immediately, and so until one dose is retained. One

scruple may be regarded as the full dose. After this, half the dose may be given once in two to four hours. Meanwhile the tincture of opium should be repeated at least once in an hour, and oftener when there is great distress, till the patient manifests the influence of the opiate by relief, or by its narcotic effects. The opium may be combined with camphor and with peppermint, or any other grateful aromatic. Likewise, from time to time, hot brandy and water, or other stimulants, may be given until the warmth is restored.

In every severe case at the first, and in every case where relief has not been obtained within two hours, blood-letting should be practised. This should be employed the sooner if the pulse are failing; for there is a risk that no blood can be procured, should delay be allowed. It is important that the patient be kept in the horizontal position during the operation; and that the orifice in the vein be large. The bleeding should be copious; that is, it should be continued till the pulse become more full or more strong, or both; or till the patient experience unequivocal relief. For this purpose, twenty, thirty, and forty ounces of blood have often been taken with advantage; although eight, ten, or twelve, have often sufficed.

If subsequent to this there be great tenderness, with some internal heat in the abdomen, leeches may perhaps be applied with advantage. The repetition of general blood-letting will not probably be found expedient, or useful, except in very rare cases.

The mere failure in the pulse should never deter from venesection. But when to this are added other symptoms of debility, after the spontaneous evacuations have occasioned great exhaustion and when the surface is covered with a clammy sweat, there can scarcely arise any benefit from the practice, and evil is said to have followed it.

Of the use of the mustard emetic in the state of collapse mention has been made already. It may be worthy a trial; but probably the experience in Great Britain will soon decide on its merits.

If the course pointed out can be successfully pursued, the patient will be restored to a more natural state of feeling, his warmth will be regained, the suffering at the perecordia will be diminished, the vomiting and purging will cease and he will probably fall into a sleep which will gradually become tranquil. In this he should be left undisturbed for a while. But many hours should not be allowed to pass before some laxative should

be administered; and this should be repeated from time to time until free dejections have been obtained of a dark, or of a yellow color. Castor oil is well adapted for this purpose, combined with other articles according to circumstances. The simple or the compound infusion of senna may be used, where the oil is not retained on the stomach. Enemata may be employed in aid of these purgatives. On this point it should be borne in mind that much may be gained by injecting a large quantity of any mild liquid into the rectum, to the amount of from two to four pints. For this purpose Maw's syringe will be found exceedingly well adapted.

When the bowels have been effectually cleared, the subsequent treatment should be of the most simple kind. The patient should be kept at rest and tranquil; his diet should be light and in small quantities; pain, or irritation, or watchfulness should be relieved by opiates; and the bowels should be moderately evacuated daily, till his convalescence is established. With patients, who are relieved suddenly by early treatment, great care will be requisite, lest by indulgence in food, or premature exertions a relapse be induced. When debility remains and is protracted after the disease subsides, tonics should be employed. By their aid the liability to indigestion will be diminished and the general susceptibility of morbid impressions will be counteracted, or lessened. The same discretion is requisite in the use of them, as in other cases. Likewise it is necessary to distinguish between the advantages of tonics and those of stimulants and cordials. Any excess in the use of these must be baneful.

A few observations may be useful in respect to remedies, which should be avoided, or used with caution, while they are such as would very naturally be suggested.

The first of these is the warm bath. When we see the patient shivering with cold, the skin livid, and suffering perhaps with cramps in the limbs, it would seem that the warm bath was peculiarly calculated to afford him relief. Yet most of those, who have tried it, assure us that its effects are often rather injurious; and that the benefits, if any, are less than those which may be attained in the same time by other means. The first impression from the warm bath is not always grateful to the patient. He sometimes complains of the heat, which persons in health support with ease and find agreeable. Sometimes the patient has been greatly distressed on immersion, so that his immediate removal has become necessary. But when present comfort is obtained from the bath and his heat restored by it, he

is frequently chilled immediately on removal, and friction will not restore him sooner than if the bath had not been employed. Meanwhile, much time has been occupied, and the patient, in the greatly depressed state of his strength, has been exhausted by the fatigue to which he is necessarily subjected.

The same objections do not apply to a hot air or vapor bath, or not so fully. This may sometimes be found useful as an auxiliary remedy. The best mode of using it perhaps is to introduce the vapor of burning alcohol under the bed-clothes, as may be done by the apparatus of Mr Jennings, long known in this country. But even in regard to this mode of bathing, we do not find very favorable reports from many persons who have tried it.

Generally it has been found that neutral salts do not operate favorably in the spasmodic cholera. The more stimulant cathartics alone, or combined with castor oil, are to be preferred; the submuriate of mercury having first been exhibited.

The sub-carbonate of magnesia has been strongly recommended by Dr Ainslie, a physician of respectability and who has had experience in India. But it does not appear that others, in trying this article, have derived from it the same benefits, as Dr Ainslie believed himself to do. Yet there may be found occasions when it may be usefully employed. It would do best perhaps added to rhubarb and combined with aromatics, such as mint, or ginger. In cases somewhat analogous to cholera this combination has been administered with great advantage.

IX. We have to consider whether any and what measures should be adopted by the civil authorities to prevent the introduction of the spasmodic cholera into our own country.

It becomes medical men to be cautious in proposing measures, which may have a tendency to interrupt the course of commerce, or to embarrass the movements of those who carry it on. The duty of governments, to guard the health of the communities under their charge, even by the sacrifice of property, will not be denied. But medical men have sometimes been justly reproached with exciting needless fears in respect to the introduction of diseases from abroad, and with thus giving occasion for measures of precaution, which have proved to be vexatious, because they have been useless. We realize this in regard to the quarantine regulations, to which our own vessels have long been subjected in various foreign countries, from the groundless fear of the introduction of yellow fever. Certainly we have

often imposed upon vessels from the West Indies restraints equally unnecessary. In offering their opinions on measures to be adopted in reference to the spasmodic cholera, the committee wish to keep these considerations in view. They are fully aware of the duty of a careful investigation of all particulars bearing on the subject, before venturing to suggest measures for the adoption of the government. It has already been seen that, in the opinion of the committee, this disease *may be* communicated from man to man, and that it possibly has been propagated in this way to the cold and temperate climates of Europe. In order to judge how far we are exposed, in the United States, to the introduction of the disease in the same way, we must inquire what laws may seem to have governed the propagation of the disease.

Experience shows that a small proportion only of the persons exposed are susceptible of the disease. But those who are susceptible are affected very shortly after exposure. In many of the instances, in which the communication from man to man seems to have been most distinctly manifested, the seizure has followed the exposure within twentyfour hours. The most careful attention to the subject seems almost to have demonstrated that the seizure is within seven days from the exposure, and usually within three. If a man continues well for ten days from the time of exposure, there would seem to be no risk that he will afterwards have the disease, unless he derive it from a new source.

It will be seen at once that, if these views are correct, the risk of a communication of the disease across the Atlantic must be very small. No instance has in fact occurred, in which the disease has been communicated between countries so widely separated by the ocean, as Europe and the United States. The greatest distance to which the disease has been thought ever to have been transported on ship board is about 2000 miles; that is, from Ceylon to Mauritius. In this case the disease was supposed to be carried by the crew of the frigate Topaze. There has been much controversy on this subject, into which the committee do not intend to enter. But, in reference to the present question, they will assume that the disease was carried to the Island of Mauritius by the Topaze. In looking at that case it appears that the crew had the disease while on their passage, and that one man was seen under symptoms of the disease after the arrival of the frigate at Port Louis in Mauritius. Twenty days after the arrival of the Topaze chol-

era began to spread among the inhabitants of Port Louis. From this time it extended rapidly over the island. It may be remarked that it is altogether improbable, and is contrary to all observations made elsewhere, that the cases noted twenty days after the arrival of the Topaze were the first cases of the disease at Port Louis, if that disease was derived from the Topaze. It is probable that cases had existed in the intermediate time; but, as all the early cases were among slaves, or the lower order of inhabitants, that they did not excite alarm till they became numerous.

But this instance has been cited to show that the disease was not carried by a healthy crew. If it was carried by the Topaze, its propagation to the island might no doubt have been prevented, if the ship had not been allowed any communication with the shore, until the crew had all been established in health for ten successive days.

In vessels having short passages from Europe to this country, if coming from places where the disease is prevalent, there is certainly some chance that the disease may be brought among us. But this can hardly happen, if no one has been sick on the passage. Indeed, if our views of the limitation of the latent period be correct, the disease cannot be conveyed in such a case. The question to be settled, therefore, on the arrival of a vessel from a place where the disease exists, is this; has any man on board such vessel been affected with the spasmodic cholera during the passage? The decision of this question will require much caution.

It has been suggested in this report, that many persons may undergo this disease in so mild a form, as not to be interrupted in attending to their usual occupations. It is only when certain states of the system are produced, that the disease is alarming in its aspect. The confluent small-pox is a most grave disease, under which the suffering is extreme; and one which terminates in death sometimes in half the persons affected, and almost always in a quarter. The distinct small-pox is very mild in many instances, so that its existence might not always be recognised, were it not for a few of the specific eruptions. Yet the confluent may produce the distinct small-pox, and vice versa. The statement, that where the spasmodic cholera has been prevalent, many and even most persons have felt somewhat indisposed, and have had some of the slighter symptoms of the disease, will at least justify the suspicion, that this disease may have its mild and its severe form of existence,

as well as the small-pox. Especially, if persons after exposure, have been affected with diarrhœa, or with any disease of the stomach or bowels, we may be authorized, in the present state of our knowledge, to suspect that such disease has had its origin in the cholera. The officers of health should be fully impressed with the importance of regarding the subject in this point of view.

Having settled what is to be admitted as evidence of the existence of cholera on board ship, it will then be sufficient that the passengers, officers, and crew, be prevented from having communication with any persons on shore until ten days have elapsed since any one has been affected with that disease. When satisfactory evidence is given that no one has been sick on the passage, which must have exceeded ten days, then men need not be detained from landing as usual. If any doubt exist, the vessel should be kept under watch till this doubt is resolved.

But although these precautions are sufficient as respects the communication by persons, a question will arise as to the communication by inanimate substances. May goods be admitted to free entry whenever men are? Is there not danger that the morbific poison may be packed in merchandize, and may act on those by whom this is unpacked?

On this point the committee have already stated their opinion. They would not indulge themselves in any undue confidence in their own judgment on a point so interesting and important to the whole country. But on a review of all the facts, which bear on this point, they feel a strong conviction that the disease has never been conveyed by inanimate substances. And they are confirmed in this judgment by that of men who have had great opportunities of acquiring information on the subject, and every inducement to give a true statement of the result. The committee refer especially to the statement from the British central board of health, which is found on the preceding pages.

The committee do not therefore recommend any restrictions on the landing of merchandize, except perhaps rags, from a diseased port. As respects clothing which has been worn by the sick, the use of the common modes of purification seems to be dictated by prudence, and is not liable to any serious objection.

The committee think it highly necessary to add that, while they would not advise restrictions on commerce unnecessarily, they consider it of the first importance that the restriction

should be absolute and perfect, where it is practised at all. When the passengers, officers, and crew of a ship are detained at quarantine, it should be because, either there is actually some sickness among them believed to be spasmodic cholera, or there is reason to fear that some one of them will be affected with that disease in consequence of a recent exposure. If there be actual disease, all the persons, with whom the sick have communication on the quarantine ground, will be equally liable to the disease. Hence it will be requisite that, during the period of detention of a ship's company, there should be no communication by persons between such quarantine ground and the adjacent country. The restriction should be without exception. If any one by accident should go on that ground, he should be detained there. The medical officer, as well as others, should be under restraints. No boatmen, nor messengers should be exempted.

Hence several subordinate regulations will suggest themselves to practical men. The two following are obvious. 1. Necessary communications must be made by telegraph ; and some place must be established where supplies may be deposited and left, which shall afterwards be taken by the officers on the ground, when the place has been left by those who have transported them. 2. If there be only one place for quarantine, then a company, which had nearly finished their period of detention, might be delayed by the arrival of another vessel requiring a similar restriction. On this account, different stations must be designated, so that several vessels, arriving at the same port in succession, may each have its company placed separately under surveillance. Until a place can be provided, no one should be allowed to land from a suspected vessel.

This last provision for distinct places may seem at first view to require numerous quarantine stations. Undoubtedly several ought to be provided. But in reality the instances requiring the measures proposed will not be frequent. They will not probably be four in a year at the port of Boston. The great majority of vessels from diseased ports will not be subject to them. Meanwhile the necessity of these distinct places will be apparent, when it is considered that all quarantine may be useless, unless perfect ; and that the public are bound, in subjecting vessels from abroad to restrictions for the public safety, not to adopt measures by which the crews of such vessels shall be exposed to danger from others, or detained unduly on account of others.

X. What measures should be recommended to the civil authorities, if the spasmodic cholera should appear among us?

If this disease be found among us, may we not adopt the course which has been so long pursued in New England in regard to the small-pox. We owe much to the firmness and sagacity of our ancestors, who wisely determined that this fatal and loathsome disease need not be allowed the free course among us, which has been permitted in all other parts of the world. But the case is different from that of the spasmodic cholera. Those who have already undergone small-pox are not, generally, liable to it a second time. Hence there were always to be found guards for variolous patients, who were not exposed themselves in attending those patients, and who would not be the medium of communicating the disease to others. It is not so with respect to the spasmodic cholera. If this disease be contagious, no one can secure an exemption from it. Hence, as has been shown, when discussing the advantages of a cordon of troops, the difficulty of secluding those once taken sick among us would probably be insuperable. If humanity permitted patients under this disease to be removed from the town or city where they reside, the exposure of many persons in doing it would probably serve only to extend the disease. If the sick, and the inmates of the houses in which they should be found, or the inhabitants of the streets where they should dwell, were confined to their own places of residence, the safety of others would not probably be secured. For under crowding and confinement the disease would more certainly increase within the limits thus assigned to it, and humanity would then require that those from without should afford their aid. Thus the concentrated disease would at last be more certainly disseminated. But we need not urge objections to measures, which we are assured would never be attempted among us.

Much, however, may be done to prevent the extension of the disease. To this end it is necessary that the public should be convinced of what experience has abundantly shown them, wherever the spasmodic cholera has prevailed, viz. first, that all those causes which are injurious to the general health, predispose men to be affected by this disease; and second, that by prompt and vigorous measures in the commencement, the disease is as much under the control of remedies, as many of the grave diseases with which we are already familiar. If it be objected, that the disease is exceedingly fatal in England and Scotland, let it be remembered that it has been so among the

low and reckless, suffering under extreme poverty. We cannot be said to have such a class among us, though we have such individuals. If these results of experience be believed and acted upon, we should not fear any great extension of this disease, should it be introduced within our borders; and, in that case, those, who should be called to minister to the sick, would see that they could perform the offices of friendship and humanity without any greater risk, than is incurred in the ordinary duties of life.

It is not our intention to point out in detail the municipal arrangements and provisions, which would be requisite if the once dreaded cholera should appear among us. It is sufficient for us to suggest some general considerations.

In all countries, where this disease has prevailed, its haunts and most favorite resort have been in the crowded and filthy dwellings of poverty. Have we any dwelling places of this description? Speaking comparatively, we might answer in the negative. But this is not absolutely true. In our towns, and perhaps in our villages, houses are sometimes overcrowded with inhabitants. We apprehend that this may be true, even in the boarding houses where many respectable mechanics and laborers have their lodging, and where cleanliness is not neglected. It is true, comparatively, in a few instances, — yet it is true, that we have some houses where the evil is aggravated tenfold by the filth in and about them, and by the filthy habits of their inmates.

Must we have a pestilence to aid us in cleansing such dwellings and in diminishing the number of their inhabitants? Such is the jealousy entertained among us of an interference by the government with private rights, that it is difficult to have such nuisances abated; and the alarm at least of a pestilence may be requisite to call out the necessary energy. The power we have surely, and the right as well as the power.

Who can doubt that, if there are men in the midst of our cities, who gather together combustibles and expose them to every wandering spark, and even to the flame visibly approaching them, we should be justified in placing any constraint on such men, which the security of our dwellings might make requisite.

But in the case we are considering, it is not our houses that are exposed. Health and life are in danger.

It is only necessary that this danger, and the true source of it among ourselves, be duly realized. Then we shall find our

municipal authorities adopting the measures necessary for obtaining and preserving cleanliness and ventilation in every house, and for enforcing every regulation necessary for the common safety. Humanity will rejoice in this case, and will afford every aid to these efforts. For what must be their result? Are the poor and miserable to be oppressed by them? On the contrary, they are to be assisted; and will be led to acquire a taste for comforts, which in our country every man can secure to himself by honest industry. The immediate burden must be on the rich. Will these complain? Of what use to them is wealth, if they will not employ it to guard themselves from a scourge, which may be as severe among us, as in Asia, and in Russia, if there be nothing in our state of society to preserve us.

We are the more ready to urge these considerations, because we regard them as applicable to the causes of disease in general; especially of severe epidemic diseases, whether contagious or non-contagious. The chance that the spasmodic cholera will extend to us may be small: but we are always exposed to disease, and to epidemic diseases; and most of these diseases take up their first abode in such residences as we have pointed out.

Thus far, the measures adopted for security in the city of Edinburgh appear to have been remarkably successful. Those measures were such as we have recommended.

Besides the dangers, which arise from our dwelling-places, are those of our individual habits. Everywhere, it has been observed that the intemperate and debauched have been the most certain victims of cholera. In more than one nation it has been spoken of as so far a blessing, that it removes from society these great pests. Such language does not belong to us. In this country we aim to reform the intemperate. It is not, however, to aid the philanthropic efforts which are making to overcome an evil much greater than the cholera, that we point out the danger to the drunkard and the dissolute: yet we are willing that such men should be alarmed by this new danger, though inferior to that which they brave every day.

It has been observed that bad diet is generally among the remote causes of this disease. Such it has been found, when made up of the variety of rich dishes used by the luxurious. But in many more cases it has been noticed in those, who use crude fruits and indigestible vegetables, because these are used by greater multitudes; and by the poor as well as the rich.

On this subject it is important that we should be distinct. In Europe animal food is used vastly less among the mass of the people, than in this country. There, physicians have advised a greater use of animal food. Let us not be misled by that advice, which, in Europe, is rightly applied. We use enough of animal food. It is rather necessary to encourage the use of vegetable food among a large portion of our citizens. To the young and vigorous this should be especially recommended. But it is necessary with us to enforce more care in the selection and preparation of vegetable food. If we use unripe fruit, or bad vegetables, or such as require thorough cookery, but are in fact only mocked by it, we are liable to suffer, as much perhaps as if we did not counteract this by a due mixture of animal food. The temperate use of good and ripe fruit will be found salutary. Excess in the use of any food will be found injurious, as well as error in the quality ; and the abundance amidst which we live renders us liable to this excess.

We must add a caution most important to all, to see that the bowels be duly regulated. For this purpose, attention to diet and exercise is more important than medicine.

Should the cholera appear among us, it would become necessary to make provision for the immediate care of those patients, who could not have sufficient attention in their own dwelling-places. But these, and various details, would be best considered by each separate community.

In closing their labors, the committee will suggest anew, that they have not been called upon to give their judgment on a subject, with which they have been practically conversant. It is on those, who have been so, they have relied. But, where those authorities have differed, the committee have endeavored to represent both sides fairly. They have not expressed a decided opinion on the question whether cholera is contagious, because the facts do not warrant such an opinion.

APPENDIX.

APPENDIX.

A.—p. 11.

'In the southern parts of Bengal, the prevailing winds are north and south. The northerly and southerly winds blow alternately during unequal portions of the year, over that quarter of the province which approaches the ocean. The seasons conform nearly with those changes of the prevailing winds, and are usually distinguished by the terms Hot, Rainy, and Cold.

'The HOT SEASON commences with the approach of March (the thermometer ranging between 73° and 86°,) and the heat gradually increases to the latter end of May, when the weather has become exceedingly sultry and oppressive. The thermometer now fluctuates between 81° and 93°, in the shade, and the nights are calm, close, and suffocating. During the hot season, the wind blows steadily from the south, with the exception of an occasional storm, of short duration, from the northwest. These storms, called in India, "Northwesters," are welcome visitors, as they serve to cool the burning air, and recruit the exhausted vigor of animal and vegetable life. The phenomena which precede and accompany a northwester are very remarkable. Towards the evening of the day on which the storm is to occur, the southerly wind, which had been previously continued and strong, dies gradually away into a dead calm. The clouds in the northwest part of the heavens have collected into a dense, lowering mass, like a mountain. Vivid lightning, and approaching thunder-peals announce the advent of the hurricane, and it bursts instantaneously, with full force, darkening the air with clouds of dust. Then follow torrents of rain; and in an hour or two the commotion is over, leaving the atmosphere cool and delightfully refreshing.

'The RAINY SEASON sets in about the middle of June, and with it, to the relief of the parched inhabitants, the atmospheric temperature declines. The wind coming round to the east, the frequent occurrence of thunder in the evening, and the constant cloudy state of the sky, are the heralds of the approaching change. The rainy season continues during the four succeeding months. In the first two months, the fall is generally incessant and heavy, an interval of a few days in succession being very unusual; but in the latter two, the intervals are

considerable and often repeated. The rivers begin to swell with the setting-in of the rains, and in the third month the Ganges attains its highest point of elevation. By this time the low country is inundated throughout, and in the rice fields the ears of the grain may be seen floating on the surface of the deluge. The habitations of the peasantry, built on artificial mounds, are raised beyond the common ascent of the waters ; yet, in visiting the fields or neighboring markets in their boats, the farmers generally carry their families, and cattle with them, lest they should be submerged and drowned in their absence.

'The COLD SEASON commences with November, and ends in February. It is the period of enjoyment in India. The wind, now changed to the west and north, has rapidly swept away the dense masses of vapor that hitherto obscured the sky, leaving the atmosphere of a deep azure, without a cloud. The nights are also clear: the air feels cold, sharp, and bracing, and the decreasing temperature, by the middle of January, ranges as low as from 47 to 75 degrees Fahrenheit. Even the cold season, however, has its peculiar evils. In the month of December, though the greater part of the day is clear, and the wind continues as before, towards evening a thin haze is observed to creep above the horizon, which, with the advance of night, is condensed into thick fogs. The fogs prevail during the remainder of the winter, rendering the mornings dark and disagreeable. No rain falls in the cold season; but vegetation thrives under the descent of copious dews. Throughout the year, the fluctuations of the barometer are exceedingly limited.

'When the seasons observe the general course and period of succession just described, their influence on the constitution of the inhabitants is productive of several maladies which are considered in a great measure peculiar to these different divisions of the year. Thus the diseases chiefly dependent upon frequent transitions of heat, cold, and moisture, as rheumatism, catarrh, intermittent fever, and diarrhœa, are the concomitants of the cold season. The scorching heats of summer are productive of bilious remittent fever, and this malady continues in the ascendant until August or September, when bilious dysentery becomes the prevailing distemper. Cholera and acute inflammation of the liver may occur in any month of the year ; but they appear to be most frequent about the beginning of the rains.

'In irregular seasons — and such will occasionally occur — the rains set in much earlier or later than is usual, forming what is called a *dry* or a *wet* year. Under these circumstances, the climatic affections are increased both in frequency and severity, and their characters will be determined by the nature of the atmospheric vicissitude. If the hot summer weather have been protracted, the enervated population suffer in an aggravated degree from the distempers common to hot seasons. If moisture prevail, the maladies of the rainy season may be anticipated in a more than ordinary abundance.'*

B. — p. 60.

We cannot refrain from the remark that the physicians of Europe have come much more tardily to the opinion that yellow fever is not

* Kennedy on the Cholera, pp. 7 — 11.

contagious than those of this country. Perhaps the majority of those who have examined the subject in that quarter of the world have not yet adopted this opinion. It is held by many however with the warmth which belongs to partisans in a recent controversy. But, having adopted it, many of those persons have been ready to indulge an incredulity in regard to the contagion of other diseases greater than they would have done otherwise. This no doubt has its influence in regard to opinions in respect to the cholera.

C.—p. 70.

In our own day we do not recollect any epidemic disease not contagious, of which the circumstances as to its extension and duration resembled this spasmodic cholera, so much as the pestilential fever of New England. But that was on a very small scale.

This epidemic, the pestilential fever, appeared first in Wrentham, Massachusetts, in 1806. The next and several subsequent years it was in Connecticut, viz. in the counties of Hartford, Litchfield, and elsewhere.

In 1810 it was in the counties of Worcester, and Middlesex, and in some other parts, of Massachusetts. It continued both in Connecticut and Massachusetts through 1811 and 1812, and occasionally till 1814. During the same period it extended to Vermont, New Hampshire, Maine, and to some parts of Canada. But during all these years it had respect to climate, not reaching the middle states; and the season, for its prevalence was in the winter and spring. In these points it resembled the proper epidemic diseases.

The epidemic called the '*black death*,' which raged from about 1345 to 1350, bears a resemblance to the epidemic of the present day in some particulars. It began in China and extended to Europe and over a great part of that quarter of the world. It continued at least six years and had no more regard to season than to climate. It was exceedingly destructive, much more so in Europe than the cholera has been.

Mr Webster in his history of epidemic and pestilential diseases has entered into more detail in respect to this than to common epidemics, and seems to have collected all that was known respecting it. He does not show that it was contagious, nor does he show that the disease in Asia and Europe were strictly the same. But he does not show the contrary. He was too much engaged in discussing these questions, as regards epidemics generally, to think the evidence in respect to any single one of much importance.

There does not however appear to be any evidence that this Chinese disease was contagious. So far as the argument from analogy goes, this would induce us to deny that the spasmodic cholera is contagious. But before we can give much weight to this argument, we must be assured that the analogy is perfect as well as that the *black death* was not contagious.

The influenza has been mentioned by some writers as an epidemic or catastatic disease similar to cholera. They resemble each other in one point; they are both wide-spread epidemics. But they differ in other material points of their history.

The influenza has very often appeared in former and latter times and is familiar to medical men. The spasmodic cholera, as it has appeared since 1817, has never before been known as an epidemic, extending over various regions and climates.

The influenza arises suddenly and is extended suddenly, so that within two years and often in one and the same year it prevails throughout the world, over the old and the new continent. The spasmodic cholera arose suddenly in Indostan, in 1817, where however it was not new, but where it was unusually extensive and severe. Since that time it has spread, not suddenly but gradually, over the ancient continent and most of the islands adjoining it, and in continued lines; occupying however more than fourteen years in doing this.

D. — p. 78.

On matters of great interest mankind are led to take every view which the subjects will permit. Hence they not only differ as to the great questions, but make distinctions very gravely and with great formality, where there is, in a practical view, scarcely a difference. Thus some deny that the spasmodic cholera is contagious, while they believe that a material proceeding from the body of the sick may produce this disease by acting on those in health. Among these is a learned and acute writer, Dr Jaehnichen of Moscow, who asserts that the great majority of the physicians of that city, after their sad experience of that disease in 1830, agreed with him in opinion. And what is this opinion? The disease is not contagious, he says, for contagion takes place through the skin. Now he contends that in cholera the morbific matter emanates from the lungs of the sick into the atmosphere and by the atmosphere is carried to those in health; and that this atmosphere received into healthy lungs acts on them, or through them, to give origin to the disease. The arguments in support of this doctrine are too trivial to deserve examination. It is plain that, only by the most rigorous experiments, frequently repeated, and such as few persons would submit to, this matter could be ascertained. That the morbific matter may be conveyed through the atmosphere and that contact of persons is not requisite to the propagation of spasmodic cholera, any more than of small-pox, measles, &c, is not denied by any contagionist. But this being granted, how shall it be decided whether this matter emanates from the skin, or from the lungs, and by which of these organs it is received. When engaged in a grave discussion on a subject, in which the lives of millions may be supposed to be interested, such fanciful distinctions are too trifling to be seriously noticed.

Various attempts have been made to give a precision to the meaning of terms in common use among physicians and the rest of the world; but such attempts seldom succeed. It is only, when terms are limited in their use to scientific men, that this precision can be attained. The term contagion was no doubt originally employed in medicine, under a belief that diseases were sometimes propagated by a contact of persons. Of course this must be by the skin mostly;

though it is obvious the mucous membrane is exposed to contact within a certain extent. But presently the term was applied to cases, where, instead of a contact of persons, there was only a contact of the matter emanating from the sick and reaching those in health. Here the mucous membrane must be still more exposed. The matter conveyed in these cases required a general name and it was denominated contagion. So that this word is sometimes used to express the mode of communicating a disease and sometimes the matter by which it is communicated. It has occasionally been applied to the matter producing a disease, whether derived from a diseased body or from an inanimate source. Infection is derived from *inficio*, to soak, to imbue ; and might therefore be applied to the matter producing disease by entering a healthy body, whatever its source ; as also to this mode of producing disease. In the notion generally entertained there was probably this idea included, that the matter must enter into the living body, soak into it, tincture it or taint it, while contagion required only that the matter should touch it. In the case of infection it might be supposed that the consequences would differ, according to the quantity of the material entering the body. Thus in a marshy district a man might not suffer from a short exposure, but only when fully infected, or imbued with the poison there developed. But so far as any distinctions of this kind were in the minds of men using these terms, they were founded on fancy rather than on knowledge. In general the terms contagion and infection are employed as synonymous, and it is best that they should be. Or perhaps it would be well to employ one only ; viz. contagion and its synonymes.

Another distinction connected with this subject has been attempted and insisted on by some medical men. The term epidemic was originally employed in reference to diseases generally prevalent in any community, such as a town, city, or region of country. As on the other hand the term sporadic was applied to diseases scattered over a community, but not generally prevalent. It is plain that this term epidemic may refer equally to diseases, which are, and to those, which are not contagious. A useless attempt has been made, as we think, to limit the term to those of the latter description. We wish to have a term which shall express the extensive prevalence of a disease, which must be a matter of demonstration, without implying an opinion respecting its nature, which may be uncertain and therefore admit of dispute. The term epidemic answers this purpose, and why should we restrict its use and thus make it necessary to seek another word to supply its original purpose. According to our own view the spasmodic cholera, which has of late prevailed in Asia and Europe, may be called an epidemic disease equally by those, who do and by those, who do not believe it to be contagious.

Instead of the term epidemic that of castastatic has been applied to those diseases, which according to Sydenham are produced by the constitution of the seasons. In this sense it has been questioned whether it should not be applied to the subject of our inquiry.

E. — p. 101.

The following is the only connected history of the cholera in Great Britain which has come into our hands. The author is very decided in his opinion that the disease is not contagious. He does not manifest the respect which is due to those who differ from him on this point. But he seems to state facts fairly and his account will, we presume, be regarded as valuable in the present time. We have omitted what regards treatment and other topics, thinking the history of the disease only important.

HISTORY OF THE PROGRESS OF CHOLERA (CHOLERIC FEVER) IN ENGLAND.

'WITH the view of putting on record something like a connected view of the history of the epidemic in England, we have committed that task to the hands of a gentleman well qualified to perform it. But as we have left him at liberty to embrace any tenets or doctrines which he pleases, so we hold ourselves entirely free from responsibility on any points of speculative reasoning which may be broached in this history. — *Ed. of Med.-Chi. Review.*

'During the latter end of the summer and autumn of last year, bowel complaints under the form of diarrhœa, and cholera, had been very prevalent at many places throughout this kingdom. The very great severity of many of the cases of cholera, an unusual number of which proved fatal in the short period of 38, 24, or even 18 hours and less, gave rise to alarms that the scourge which had been devastating the Continent of Europe had appeared in this country. At Port Glasgow, Leith, Hull, and Margate, these reports were successively raised; while in many other places, the existence of the same diseases was passed by unnoticed. Such was the case in Sunderland and its neighborhood, where this epidemic first appeared in all the continued malignity and extensive prevalence by which its progress in other countries has been marked.

'SUNDERLAND. — On the 26th October, a man of the name of Sproat who resided at Long Bank in Sunderland, died of the cholera: — he was about 60 years of age, a laborer, and had suffered under slight diarrhœa for several days before his death. About half an hour after the death of this man, his grand-daughter was taken ill, and the next day her father; both were removed to the hospital, where the girl recovered, and the father died on the 31st. On the same day also died, a keelman of the name of Wilson in High-street, and a shoemaker named Rottenburg, who lived in a low and confined house on the Monk Wearmouth Shore.

'On the 1st of November another death occurred, that of a nurse at the infirmary, who had assisted in removing the dead body of the younger Sproat from the ward of the hospital, but who had not attended him during his illness. Subsequently to her having assisted in carrying the dead body, she was seized with extreme alarm respecting cholera, and the danger of being infected by the dead body.

She died in six hours after the first attack. From the first to the fifth of November, no other case was noticed. On the latter day one case occurred; and on the 6th and three following days, the disease became very prevalent, 26 persons were seized, 14 of whom died. It continued to rage in Sunderland, with fluctuations in the degree of its severity; declining for a few days, and then again, for a like period, increasing until the third week in December; when the number of fresh cases diminished to rather less than one third of the previous average: from the 26th to the 30th, but five new cases are reported, and from that time the disease may be considered as having nearly ceased in this town. Up to the 24th January, but six new cases having occurred at distant intervals; this town then remained free from any case of sufficient severity to be reported cholera until the 8th of March. On that day two new cases occurred. The total number of cases reported up to this time are 538 and 207 deaths.

'We have to remark, that the number of cases and deaths, has not been accurately reported; especially in the early part of the time. It became a matter of interest to the inhabitants, to conceal the presence of the disease among them, from the injury their commerce received by the quarantine regulations imposed under the belief that it was contagious, and to such a pitch did this public feeling rise at one time, that the reporters of the first appearance of the disease, were in danger of personal violence from the mob, if their names could have been ascertained; and many surgeons to ingratiate themselves with their townsmen, were charged with concealing and misrepresenting the nature of the cases which occurred.

'Up to Nov. 10, the severest cases only were reported. From the 11th to the 21st, they attempted to conceal the nature of some of them under the name of common cholera, and even of diarrhœa; but after the 21st, the column for diarrhœa was discontinued, and after the 26th, that for common cholera also. All those cases of the diseases of the season, which did not greatly surpass the ordinary severity of diarrhœa being then altogether excluded. It is greatly to be regretted that some correct classification of the cases according to their severity, was not subsequently attempted: for a knowledge of the proportions which the different forms of these disorders of the alimentary canal bore to each other, together with the observation of the circumstances under which each occurred, would in a great measure have enabled us to ascertain the causes of the disease.

'Nevertheless, that cases of diarrhœa were more prevalent than those assuming the milder or severer forms of cholera, we learn from the comparison of the mortality during these 11 days with that of all other subsequent periods. Thus from the 11th to the 21st of November, of cases under the head of common and malignant cholera, we have 85 new cases, and 33 deaths; and under the head of diarrhœa, 111 new cases and 4 deaths; for the first period of 11 days after the 21st of November, 126 new cases, 49 deaths; for the second, 105 new, 51 deaths, and for the third, 73 new cases, 39 deaths. Now taking the mortality of the first period at one third, being the lowest proportion reported, and adding 12 of the diarrhœa cases to the column of cholera, as all that could have been erroneously reported, the proportions will be 97 cholera, 99 diarrhœa, the latter still preponderating.

'We extract the following observations, on the Statistics of Sunderland, from the work of Mr Parsons.

"The town of Sunderland consists of three parishes; viz. Monk Wearmouth, with a population of about 6,000,—Bishop Wearmouth, with 14,000,—and Sunderland with 20,000 inhabitants. In Bishop Wearmouth nearly all the wealthy inhabitants of the town reside, and the number of its pauper population is very small; the streets are generally sufficiently wide and clean, and their elevation above the level of the River is from 110 to 120 feet. In Sunderland, which is a continuation of Bishop Wearmouth, there are very few streets of proper width, and their general elevation above the level of the River is from 70 to 90 feet lower than in the adjoining parish. The bye-streets are extremely narrow, several not being broad enough for the passage of a common cart, and during my residence in the town they were rarely cleansed from the dirt, and other impurities allowed to accumulate in them, for many days together. The houses in these bye-streets or lanes commonly had no yards or courts attached to them; the rooms were dark, ill ventilated and dirty; the passages and stairs were dirty through the great number of persons living in each house; and very often each room, from the cellars to the attics, was occupied by a whole family:—Dr Barry found 120 individuals living in one of these houses. In the parts bordering on the River, Monk Wearmouth closely resembles Sunderland in the crowded state of its poor inhabitants. For several years past it has been the custom in Sunderland for the parish managers to contract with some individual for the maintenance, &c, of the whole poor of the parish. When this plan was first adopted, now about seven years since, the annual expense for this purpose amounted to upwards of £9000, the number of persons contributing to the poor-rates, being at that time, as it is at present, rather more than five hundred, and consisting almost entirely of the shop-keepers and others necessarily resident in the place; but, by means of the farming system, the annual expense has been gradually reduced to its amount in the present year, of between three and four thousand pounds, with, it is believed, a considerably increased number of claimants on the parochial funds. A necessary consequence of this cruel economy, was the state of great destitution in which the poor existed at the time of the appearance of cholera among them; and, although much was done towards improving their condition, by giving them clothes, bedding, fuel, &c, still it was found that individual exertions were manifestly unequal to counteract the ill effects, on the public health, of extreme and widely diffused poverty, and its too frequent consequences, a neglect of cleanliness, drunkenness from the immoderate use of ardent spirits, and the gratification of other depraved propensities. The death, by cholera, of Mr Middlebrook, the late contractor for the poor, has released the parish from its engagement to him, and the system of farming the paupers is now, though late, abolished."

'The ravages of the disease were chiefly confined to the parish of Sunderland; in Bishop Wearmouth, which contains at least one fifth of the whole population, but only a small portion of the pauper inhabitants of the town, a few cases occurred in the middle of November, and again in the beginning of December; but up to the 12th of that month the number of deaths in this parish did not ex-

ceed 20. In the parish of Monk Wearmouth but few cases occurred, not more than 15 deaths having taken place from the disease up to the same date.

'With regard to the parish of Sunderland itself, the disease was almost exclusively confined to the low, dirty, and confined lanes in thickly populated districts, not more than 12 cases having occurred in the upper and more widely-built portion, although the freest and most unrestrained communication existed with those places where the disease raged.

'It was strangely at variance with all preconceived ideas on the subject, that this disease should remain so long confined to Sunderland, although restrictions on the inland intercourse, between the inhabitants of the town and surrounding country, were not imposed; and those who had expected that its progress there would be in proportion to the rapidity of communication between the different towns of this country, began to entertain the delusive hope that its ravages would not extend further.

'Although one case had appeared at Newcastle as early as the 26th October, and five between the 28th November and 9th December, it did not prevail extensively here until after the 10th of this month, and about the same time it broke out in various parts of the surrounding country. In the neighborhood of Newcastle, Walker Township and Colliery were now affected, together with Sedghill, New York, and Wideopen Collieries. Along the coast it appeared at Blyth about seventeen, and at North Shields about seven miles north of Sunderland, and at Seaham, a small fishing port about four miles south. There were rumors of its having occurred also at Alnwick and Chester-le-Street, although not noticed in the official reports. It also appeared about this time in the extensive parish of Houghton Le Spring, on the south bank of the Wear, between Sunderland and Durham, and on the 17th December at Haddington, in North Britain, 105 miles distant from Newcastle. It now becomes a matter of extreme difficulty to trace its subsequent progress with any degree of accuracy, owing to the irregular manner in which it spread over the country, and still greater irregularity with which its appearance at most places is reported.

'While extending along the south shores of the Frith of Forth from West Barns to Edinburgh, it also continued to affect in the most capricious manner various places in the neighborhood of Sunderland and Newcastle. On the 22d of January, it appeared at Kirkintilloch, on the Forth and Clyde canal, about seven miles from Glasgow, and in the beginning of February it broke out in London, in Glasgow, and various parts of that very populous neighborhood, still continuing to extend around the places which had been the theatres of its former irruptions.

'From this extreme irregularity of the progress of the disease, it becomes very inconvenient to notice the places attacked in the order of time when it first appeared in each. Our narrative will be less broken by arranging them in the order of proximity to the place first affected.

'Seaham. — Along the eastern coast it has appeared at the fishing port of Seaham, about four miles to the south of Sunderland. It

does not appear to have prevailed very extensively in this place; for, from the 15th of December, the date of the first, to the 21st, the date of the last report, only seven cases are noticed, five of which were fatal.

'North Shields and Tynemouth.—This place lies about seven miles to the North of Sunderland, at the mouth of the Tyne: it is remarkable for the long time during which the cholera has continued to prevail, and the slow progress which it has made; from the 11th December to the end of the month, only 19 cases are reported, and these occurred on the 11th, 13th, 19th, 20th, 21st, 22d, 23d, 27th, and 30th.

'In January cases began to occur every day; in the first week 20, in the second 24, in the third 23, in the fourth 45, and in the fortnight form the 29th January to 11th February, 122. We ought to observe that in the latter part of this time are included cases from the neighboring townships of Murton and Chirton. Up to the 3d of March 334 cases and 97 deaths had occurred.

'South Shields.—At this place, which lies on the opposite bank of the Tyne, nearer Sunderland, it is remarkable that the cholera did not break out until the 27th December, and then prevailed only to a very trifling extent, eight cases having occurred and three deaths only in the first four weeks after its first appearance, and in this number is included cases from the neighboring townships of Westoe and Hebburn colliery.

'It has also appeared along the coast at Seaton Sluice, a few miles to the North of Tynemouth; at Blyth, ten miles distant, and at Hartly, where are extensive collieries, glassworks, and other manufactories, about four miles E. N. E. of Blyth. It is remarkable that its appearance at Seaham was in December, and this place was entirely free, when Hartly, close by, was severely affected in the beginning of February.

'Next, following the course of the Tyne, it has been very prevalent in the towns and collieries which are scattered along its banks, and at a distance of a few miles.

'At Earsden colliery, about four miles to the north of Shields, it broke out in January: the first reports from this place are dated the 25th and 26th of that month. On the first day 32 cases and 4 deaths are reported; on the 26th, 10; on the 28th, 6. Eighteen other cases occurred up to the 6th of February, and four on the 7th, after which the reports are discontinued; making a total of 74 cases, only 8 of which were fatal. In this place we observe a very small mortality; and it is probable that the majority of the cases occurred in the form of diarrhœa, for while some report only the severest of the cholera cases, others include many if not the whole of the cases of diarrhœa which prevailed at the same time: hence we cannot correctly ascertain the severity of the epidemic in different places, except by comparison of the mortality with the whole population.

'Percy Main, the next place in order of proximity to Shields, situate on the north bank of the Tyne between Newcastle and Shields, was one of the last places attacked. The disease broke out here in the beginning of February with great violence; in ten days

90 cases having occurred, and 12 deaths. It afterwards continued to prevail, but with diminished fatality.

'At Howden Dock and Wallsend, almost close to the former place, it appeared in the beginning of January, but with little severity; up to the end of the month, when the reports ceased, but 32 cases and 12 deaths having occurred.

'Along the South bank of the Tyne we have already noticed Westoe and Hebburn in the reports from South Shields. The latter place is in the parish of Jarrow, which also contains the Chappelry of Haworth. Here and in the village of Jarrow, and also in the parish of Washington the cholera has appeared.

'At Newcastle we have already stated that one fatal case of cholera occurred on the 26th October, the day that the first acknowledged case occurred in Sunderland. No other fatal case was afterwards noticed until the 26th of November, when a man of the name of Jordan died. This was a laborer, of temperate habits, and previous good health, residing in a small and dirty room in the New Road, the floor of which was somewhat below the level of the street. From the minutest inquiry it did not appear that this man had been in any way exposed to possible sources of infection. The alarm was now raised, and other cases were noticed; but up to the 8th of December only five cases had occurred in all; two of which were fatal. Up to the 12th, 12 cases and 3 deaths had been reported.

'In the course of the next seven days, namely, to December 19th, it began to prevail extensively; 86 new cases and 34 deaths occurring. In the week ending the 2d of January it arrived at the height, 211 new cases and 56 deaths being reported; from this time it declined slowly; from the 2d to the 9th day the new cases and deaths were 159, 52; from the 7th to the 16th, 118, 38: from the 16th to the 23d, 86, 29; from the 23d to the 30th, 65, 26; from the 30th January, to 6th February, 32, 7; from the 6th to 13th, 8.

'The population of Newcastle is 70,000. In the early part of this time its ravages were confined to the banks of the river, particularly in Sandgate and the lanes running from it; but in the beginning of January many cases occurred in the higher parts of the town, as in Westgate, Percy Street, and Prudhoe Street.

'Gateshead. — Gateshead, a populous borough, containing about 10,000 inhabitants, and separated from Newcastle only by the River Tyne, with which place the most constant intercourse exists, presents one of the most remarkable circumstances hitherto noticed in the progress of the cholera in England. It has been considered a fact establishing the contagious propagation of this disease, that it should sometimes first appear at that end of a town which lies nearest the place previously affected; but although the road from Sunderland to Newcastle lies through Gateshead, and the most frequent intercourse exists between all these places, and cholera had raged with great severity in Newcastle for more than a fortnight, up to the evening of the 25th of December only two cases had occurred, one on the 14th and the other on the 24th. On the morning of Christmas day this disease broke out with the greatest violence, and in the short space of three days 142 cases and 55 deaths had occurred. On the 26th, 39, 10; on the 27th, 59, 32; and on the 28th, 44, 13. In the course of

the first week 250 cases and 71 deaths are reported; but its decline was almost as rapid as its inroad; in the second week, of new cases and deaths there were 95 and 42; in the third week, 30 and 15; and from this time up to the 2d February, when the disease ceased, only 20 cases and 12 deaths are reported. Seven of these appeared on the 7th of February.

'In Gateshead, as in all other places, it prevailed to the greatest extent in particular parts of the town, chiefly in Hillgate, Pipewell-gate, Oakwell-gate, Jacsonk Street, and Bottle Bank. As usual, the chief number of its victims are found among the most wretched class of the inhabitants; but here a very considerable number of working people in more comfortable circumstances were affected, and its extraordinary violence during the first few days has been ascribed to the powerful assistance which gluttony and drunkenness have always been found to give to the other causes of this disease; and it is well known that Christmas Eve is devoted to the enjoyment of good cheer among the lower ranks in this country; and that drunkenness prevailed to a frightful extent in Gateshead on Christmas Day, we have the testimony of many witnesses. But it is another of the strange anomalies presented by this epidemic, that other places, as the lower part of Newcastle, were equally dissipated, and infinitely more exposed to contagion, situate also not many hundred yards distant; thus precluding the possibility of the existence of any different atmospheric state: and yet the irruption of this disease was simultaneous over many parts of the parish, in a track 3½ miles around the Borough. At Gateshead Fell, up to the 27th, 10 cases had occurred and 6 deaths; and it subsequently prevailed with much severity; but such reports as have been given are included in the former. This village occupies a high and bleak situation, about two miles from the Borough, and in this respect forms a striking contrast to the low confined parts of the towns of Sunderland and Newcastle, where the cholera has chiefly raged; but it appears to us that too much has been attributed to bad air and dirt: no doubt some part of the effect is due to them; but most is to be ascribed to the constitutions of the usual inhabitants of such places. At Gateshead Fell, the abodes of squalid poverty have been the domicile of this disease; and the houses in which it has occurred are said to have formed one of the most miserable features connected with this epidemic. The subjects of attack were seen lying in pairs in the same room with the dead, or those laboring under severe symptoms.

'In many of the collieries and villages around Newcastle the cholera has prevailed to an alarming extent; in others it has been very slight, and some isolated cases have occurred in the inhabitants of lonely houses, far removed from all previous communication with the sick.

'To the east of Gateshead Fells, Ayrton Bank, has suffered; to the south some cases appeared at Chester-le-Street, in the early part of December, but it has not subsequently prevailed. In the beginning of January, Wickham was attacked a little to the east; and in February a case occurred at Friars Goose.

'In Newburn, a village containing about 400 inhabitants, about five miles from Gateshead, the cholera commenced on the 1st of January. During the last half of that month it prevailed with very

great severity, attacking upwards of 200 persons. In February it declined; and up to the 9th of this month the mortality had been 57 out of 300.

'In this irruption the rector and some other persons of comparative opulence fell victims. The disease was not entirely confined to the village, but extended itself over a considerable portion of the parish, which contains upwards of 5,000 inhabitants, scattered over a space of about five miles.

'In the villages and collieries to the north of the Tyne, around Newcastle, the cholera has prevailed with varying degrees of severity, breaking out and again disappearing in the most irregular manner.

'To the West and N. West, Dunstan, 2½ miles distant, was affected in the last week of December; subsequently it has prevailed extensively at Benwell, three miles distant; it appeared in the middle of January, and also in the neighborhood of Elswick, Scotswood, Bells Close, and Leamington, ceasing about the end of January; but breaking out in Walbottle, New Wynning, Black Collerton, 4¼, and Wylan, nine miles distant, in the beginning of February. At Halswhistle, eighteen miles distant, one fatal case occurred. A young man, who had left Newcastle on a visit to some friends at that place, was taken ill with the cholera immediately on his arrival, and expired in a few hours.

'To the N. and N. E. of Newcastle, Seghill, and New York, and Wide-open Colliery were affected, about the same time as Newcastle, and the disease ceased in the beginning of January. Seghill is 6½ miles distant. At Killingworth and Backworth Collieries, about the same distance, it appeared, in the former in the latter end of January, and in the latter in the beginning of February, breaking out with such violence as to produce 70 cases up to the 7th, and 8 deaths.

'At Alnwick it was reported to have appeared early in December, but has not there prevailed. At Durham, Morpeth, Stockton-on-Tees, and Doncaster, single cases have occurred, and at Pittington, a short distance from Durham, in the direction of Hetton. In the extensive parish of Houghton-le-Spring the cholera has prevailed at the villages of Houghton, Hetton, Rainton, Penshaw, and Newbottle. The population of the whole parish is about 2,000; of these the township of Hetton contains 999. The first cases occurred at the village of Houghton. This place occupies an elevated situation, and is inhabited by people in comfortable circumstances, but it never prevailed to much extent. At the same time, namely, in the beginning of December, some cases also occurred at Newbottle, also in a high and bleak situation; in the latter end of the month, Penshaw is added to the reports; and, in the beginning of January, Hetton. This place, distinguished by the significant name of Hetton-in-the-Hole, has furnished nearly the whole of the cases reported from the parish. From the middle to the end of January it prevailed here with very great severity, declining in the beginning of February. The numbers again increased towards the middle of the month.

'In Middle Rainton, a village close by Houghton and Hetton, the cholera did not prevail extensively until the beginning of February.

'Haddington. — This place, selected by the cholera for its first

eruption in Scotland, is situated on the bank of a small river, the Tyne, which empties itself into the German Ocean: near Dunbar the North Road passes through it: the distance from Edinburgh 17 miles, and rather more than 100 from Newcastle. The first case occurred here on the 17th of December. A man of dissipated habits, who had been wandering about in a state of intoxication, and almost naked, the previous night, was attacked on the 17th, and died on the 20th December. No other person was seized until Christmas day, when two other cases occurred, one a girl of seven years of age, the other a woman of dissipated habits. On the 27th three others were seized, and now it prevailed pretty extensively for a fortnight: up to January 9th, 34 cases and 15 deaths had occurred: it declined after this; but 11 new cases and 8 deaths taking place in the succeeding fortnight, up to January 25th. On the 29th of this month it again increased in severity, producing 56 cases and 30 deaths in the fortnight preceding the 7th February.

'The earliest cases occurred in a filthy close locality on the river-side, and the debauched, the half-starved, and old persons, as in most other places, constituted the major part of its victims; but, during the first severe irruption several respectable persons died, among whom may be particularized the Procurator Fischal, and a well-known school-master. It has been remarked, that this first irruption was confined to the eastern part of the town, to a space perhaps not more than one hundred yards square; but in the second attack that place was entirely forsaken, the disease appearing again in a circumscribed situation, of like extent, in the centre of the town, and among those who perished in this attack are noticed a number of highly respectable and opulent individuals. It is also here remarked, that its seizures generally took place in the night, but very few young persons being affected, all those seized recovered with one or two exceptions.

'The population of Haddington is 5255, and the severity of the disease has been trifling if compared with many other places in this neighborhood.

'The next place affected was Atherstone-ford about two miles from Haddington. Here two cases occurred on the 8th January; but, after this, it does not appear to have prevailed here.

'Tranent. — This village lies on the North road, about seven miles west of Haddington. It contains about 1700 inhabitants; with the exception of some shopkeepers and other tradesmen, they are chiefly composed of colliers and other laboring people. The first appearance of the cholera here is not very accurately noticed: rumors of its breaking out were first raised on the 15th of January, from the occurrence of several fatal cases together, but afterwards it was recollected that three other cases had previously occurred, which, at the time, were passed by without notice. One of these, an old woman of 70, died, after a few hours' illness, on the 12th; but, as she had been complaining for several years, no particular notice was taken of the disease at that time.

'On the 14th a boy, aged 12, of the name of Reid, who had gone to his work as usual in the coal-pit, was there taken ill; he fainted twice before reaching home — his strength became prostrated — the

symptoms of cholera followed, and he died on the morning of the 15th. His sister, aged 25, was also at work below ground on the 14th, during her usual hours, and sat up till about 12 o'clock at night preparing a dress, when she was seized with the complaint, and died in the afternoon of the 15th.

'On the 15th, a man of the name of Mustard was taken ill, and died the following day. This man was the son of the old woman whose case is noticed above. On the 16th, the father of the children who died on the 15th was taken ill, and a beggar, at the time residing in a low lodging-house in Tranent. The disease rapidly increased, having seized 49 persons, and proved fatal to 20, up to the 23d January; the reports continue to furnish an increasing number of cases up to the 12th of February; the first week after the 23d January having of new cases and deaths, 42, 17; the 2d, 57, 21; the 3d, 64, 25; and the 4th, 91, 12. In the succeeding week, namely, to the 19th February only, the disease declined to 18 new cases and 8 deaths.

'We have seen the cholera spreading in the North of England by successive irruptions, and such has been the case in Scotland; for a month had it prevailed at Hattington before it affected the surrounding country, with the exception, of the cases noticed at Atherstoneford; and simultaneous with its appearance at Tranent, Musselburgh was affected, as well as Preston Pans, North Berwick, Biel, near Dunbar, Southfield, and Daddeston. Near Edinburgh, reports of its appearance also came from Dalkeith, Preston Hollm, and Howgate, all on the banks of the North and South Esk, and Hawick, in Teviot Dale. In the course of the next eight or ten days, we find scattered cases from various parts of the surrounding country, of which West Barns, Stenton, and Willingham may be noticed; and, on the 26th, a case at Leith, with 6 on this day and the next in Edinburgh.

'On reference to the map, it will be seen that this locality, from 10 to 15 miles in width, occupies the Southern shore of the Frith of Forth, from Edinburgh to the neighborhood of Dunbar, a distance of 28 miles; a track occupied by fishermen and by colliers, like those in which the cholera had prevailed in the North of England, and, with the exception of the rising ground in the neighborhood of Edinburgh, towards Dalkeith, low and flat. For this irruption, various concomitant circumstances have been considered the cause. Some dwell upon the revelries of old Hansel Monday, the 16th January, being the first Monday of the year, old style, when the population of Edinburgh poured into East Lothian to visit their friends; others notice an unusual influx of beggars into Tranent during the month of January, driven there by the regulations formed at the different burgh towns, for the expulsion of vagrants; and others, again, remark the occurrence of the disease chiefly among the colliers at Musselburgh, who had struck for wages. Whatever may have been the cause, this disease has raged in Musselburgh, Tranent, and Preston Pans, with far greater severity than hitherto in any other place in the United Kingdom.

'From Musselburgh, the first case is reported on the 18th January, followed by 9 on the 19th, 17 on the 20th: up to the 23d, 81 cases had appeared — 29 had died. It continued raging with equal severity until the 9th of February. Up to this date, 386 cases had occurred, and 170 deaths; in the next week, the number of cases is 1-3d below

the previous average, and, by the end of the month, it had almost entirely ceased.

'Typhus fever prevailed amongst the families of the poor before and during the prevalence of this epidemic. The reports give but a very unfair account of the diseases of the season, the greatest care being taken to exclude all but those cases which presented the severer symptoms of cholera. At least an equal number of bowel-complaints, severe enough to require medical treatment, were unreported.

'Preston Pans, lying on the coast, between Musselburgh and Tranent, two miles distant from the former, was affected on the 20th January. The first case was that of Jas. Renton, at Preston Grange Colliery: he became unwell about 9 o'clock, P. M. but continued working till about 12; he died the next day. The 2d case was his child, aged about 2 — died in 12 hours. The third was the wife of a miner. Of the 6 cases seized on the 22d, one was a carpenter, who made Renton's coffin; another a woman, seized while looking, from her stairhead, at the assemblage of people at the funeral; two were children of widow Bolton, who attended Renton's family when in distress; the other two were altogether unconnected. Beggars, colliers, and dissipated persons form the majority of the fatal cases. The prevalence of the disease was here progressive, increasing up to the end of the first week in February, and then again declining.

'We have noticed the existence of the cholera in Haddington for a month before these places were affected; but a reference to our table will show, that the agent producing it must have operated simultaneously over this track of country; for it appeared, arrived at its height, and declined at Tranent, Musselburgh, and Preston Pans; the second irruption at Haddington arriving at its height at the same time, and then declining with them.

'In the latter part of the time a case appeared at Wallingford, a village half-way between Musselburgh and Tranent.

'In the neighborhood of Haddington, one case occurred at Gladsmuir, 7th February.

'At West Barns, two miles from Dunbar, it appeared first on the 25th of January. Five fatal cases had occurred previous to the 10th February; on that day 3 took place; and, up to the 23d, 7, of which 4 were fatal.

'It appeared at North Berwick about the same time as at Preston Pans, continued to prevail during the first week in February, up to which time 15 cases and 5 deaths had occurred. After this time it ceased, but a single case happening on the 10th.

'Portobello, midway between Edinburgh and Musselburgh, was not affected till the 18th February. The reports from this place are furnished very irregularly. Twenty cases had been fatal up to the 23d of the month.

'Dalkeith. Single cases occurred at this place in the latter end of January and through February, but very few persons have been affected.

'Edinburgh. At this place, diarrhœa had been prevalent through

the autumn, and typhus fever. We also hear rumors of fatal cases of cholera appearing at times. On January the 27th, the first acknowledged cases of this epidemic occurred. Three persons were seized on that day, and the same number on the 28th, half of which proved fatal. Of these early cases, some had not been in the way of receiving infection, others had been at Musselburgh, but it is not said whether they had been there exposed. They were of middle age, or old persons of dissipated habits, inhabiting the confined and dirty closes of the old town. From this time to the 6th January, no other case occurred; up to the 15th, but 6 other persons were seized; on the 16th and 17th of February, 7; and, between this and the 22d, but a single case appeared: in the month of March, the disease again ceased.

'The history of the irruption of this disease in the neighborhoods of Glasgow and London, we must defer to another opportunity.'

POSTSCRIPT.

Just before this Report was put to the press, accounts were received of the irruption of the cholera in Paris. It first appeared in that city about the 27th of March. Its increase was most rapid, the deaths shortly amounting to hundreds a day; on the 9th April to 861, by the printed reports. It was even said that many more died than were reported. By one account there were 20,000 deaths before the 23d of April. Probably this was an exaggeration. It is certain however, that the number of cases was very large, and the proportion of deaths frightful. By the last advices the number of cases had greatly abated and the disease had assumed a milder aspect. At the same time it was stated that the disease was extending, not only to the villages round Paris, but to various departments of France.

The cholera also extended to Dublin and Cork in Ireland, about the middle of April.

In London it had nearly disappeared at the end of April, and so also in Scotland. The whole number reported in London was about 2500, of whom rather more than half had died. It is probable that many slight cases were not reported.

We have not seen any account of the introduction of the disease into Dublin and Cork. Nor has any account reached us from Paris, which would aid us in judging whether the disease was imported there. It is remarkable, however, that the disease had not appeared at Havre, before it did in Paris, though it has since.

From the medical officers of the Paris Hospitals, Hotel Dieu, and St Louis, we have statements that, within those hospitals, the cholera has not shown itself to be contagious. It is however certain that several medical men have died of the disease in Paris. It is also to be noted that the disease has occurred in many individuals of the higher classes in that city; yet probably the proportion has been much less in these classes, than among the poor.

The difference in the extent of the disease and in its fatality in London and Paris is not easily accounted for. There cannot certain-

ly be so great a difference in the numbers of miserable poor, as in the numbers affected with cholera, in these two great cities. There is, no doubt, a difference in diet ; but this is probably less between the poor of the two cities, than between the rich. There was one cause however, which operated in Paris and not in London, and which may account for a part of the difference in the numbers affected. We refer to the mobs, which occurred in Paris in the first week of April. During the week following these mobs the increase of the disease was extremely rapid. Similar mobs took place in St Petersburg in Russia, when the cholera prevailed there in 1831, and in like manner the disease immediately extended its ravages in a shocking manner. It is easy to perceive how the distress and the excesses, attending such agitations, would cause this extension of the epidemic. It is remarkable that both in St Petersburg and in Paris, and likewise in Hungary, the notion was adopted among the poor that it was by poison, and not by disease, so many deaths were produced.

When the epidemic has subsided, we shall hope to receive from the enlightened physicians of Paris, an accurate history of the disease in that metropolis. In one respect at least, we shall look for precise accounts, viz., as to the morbid appearances discovered in the victims of the disease. No men have ever lived better qualified to make accurate observations of this kind than Andral and Louis.

June 7th.

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