

*Dr. Macpherson, with the Author's  
Sincere Thanks*

CHOLERA ASIATICA MALIGNA.

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BY

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*Reprinted from the MEDICAL TIMES AND GAZETTE, August 25, September 1, 8, 22  
and 29, and October 29.*

LONDON:

PARDON & SONS, PRINTERS, PATERNOSTER ROW.

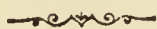
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## CHOLERA ASIATICA MALIGNA.



THE Cholera of Lower Bengal, of which I had more than twenty-seven years' experience, has been so fully and faithfully represented in works of great labour and research by several contemporaries of my own, that I shall not offer a description of its general characters which will be found amply detailed in the valuable monographs of John Macpherson ("Cholera in its Home," and "Annals of Cholera"), of Edward Goodeve (*Art.* "Cholera" in Reynolds's "System of Medicine"), and Charles Macnamara. I shall, therefore, only submit to my readers notes upon very important points which have received my special attention.

### CHOLERA A PERNICIOUS FEVER.

A great body of well-ascertained facts supports the position taken up by the College of Physicians, in their Nomenclature of Diseases, that Cholera is a Pernicious Fever. Many Indian observers have maintained this view, and careful study of disease in India goes far to confirm it. I have here placed before myself the duty of stating facts, not of forming theories, or of discussing the theories of others, except by showing how far well-ascertained facts uphold or are opposed to them. I do not consider that the present state of our knowledge permits others or myself to write dogmatically upon the perplexed question of the Cause of Cholera, but I am strongly led, by observation and reading, to side with the maintainers of the Fever doctrine.

In previous chapters I have described several forms of Pernicious Fever, which certainly have the appearance of forming a continuous chain of clear, intermediate etiological links between the Malarious Remittent of India and Asiatic Cholera. I will beg the reader to place the volumes (*Medical Times and Gazette*, vol. ii. for 1882 and vol. i. for 1883) before him, and to look back to these cases and observations as I shall now refer to them.

1. To me it appears that Allan Webb's cases of so-called "Hill Colic" (page 406, vol. i. for 1883), and my case of the Mohammedan in the following page, may be taken as forming the first links in this connective chain. Here we have the strongest expression of Algide Pernicious Fever, with intestinal lesion, but without Cholera stools; rapid death by nervous shock and blood-poisoning, with collapse as its main characteristic,—vitality failing almost suddenly under an overwhelming dose of a strong poison.

2. Next in order we have cases of well-marked and fully developed Remittent Fever, by no means rare in India, represented by Dr. Sutherland's case (vol. ii. for 1882, page 689), and by Mr. Raleigh's cases (vol. i. for 1883, page 266), taking on the diaphoretic algide form—collapse threatening death, with sweating, but without vomiting and purging, at the end of a regular paroxysm of fever.

3. The next link is formed by so-called cases of "Hæmorrhagic Dysentery" (which, however, display no character of true dysentery), not infrequent in India, where paludal fever displays the pernicious character by an enormous flow of disintegrated blood from the bowels with collapse (*vide* Mr. Hare's case, vol. i. for 1883, page 407).

4. Then come cases, undoubtedly of fever, with heat of skin, with or without vomiting, and with copious discharges of thin sanguinolent fluid, such as the following, by Baboo Odooy Chand Dutt:—A native prisoner, aged twenty, was admitted with Intermittent Fever, not apparently very severe, of six days' standing. The next day it was reported that he had fever throughout the preceding day and night, which remitted. On the third day there was the same report. At 4 p.m. he had three copious watery stools of a bright red colour, very thin, without large coagula. He became pulseless and collapsed, and died in an hour. The peritoneum and large intestines generally were congested. About a pint of reddish serum was effused into the abdominal cavity. Cæcum congested, thickened, and covered

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\* *Indian Medical Gazette*, February, 1869.

with red patches. Large intestines filled with a dark-yellow fluid.

Six months later, a prisoner, aged thirty, complained of fever for two days, for which he only sought admission to hospital on the third day. He had vomiting and purging that morning. In the afternoon he had two copious watery stools of a deep dark-red colour, with flocculent yellowish deposits, and vomited thrice—bile and mucus. He was found with sunken eyes and very feeble pulse, abdomen sunken and free from tenderness, very restless. He had one scanty stool at night of a deep red colour. On the following morning collapse had passed away, but there was sickness and retching. He had strong fever at noon, which left him in the evening with a weak pulse. On the next day he had fever with sickness from noon till 4 p.m., less strong than on the preceding day. Quinine had begun to tell. On the following day he felt pretty well, but very weak. He had no further bad symptoms.

5. I twice saw, in Bengal, an outbreak of a disease which wanted none of the usual characteristic symptoms of true Asiatic Cholera, except that the rice-water stools were blood-tinged. [In another similar outbreak I would recommend careful thermometrical observations.]

In the museum at Haslar Hospital there used to be a dried preparation of the lower part of the ileum taken from a patient who died in the first Epidemic outbreak of Asiatic Cholera in England in 1832. For about a foot above the cæcum it was of a deep mulberry-red colour.

In the only outbreak of truly *Epidemic Cholera* that I chanced to see in Bengal, in 1849, I found, in all of my numerous fatal cases, intense redness of the lower part of the small intestine (over which there was great tenderness during life). The stools were rice-water-like without the slightest tinge of blood. This was accounted for by the presence of a condition which I have never again met with in cholera. The congested mucous membrane was evenly coated by a strongly adherent, croupous-like, white exudation, nearly as thick as the intestine itself. From the inner surface of this, thin white processes floated convergently towards the axis of the canal into shreddy rice-water fluid. Clearly, all passage through the inflamed gut had ceased some time before death. Mentioning this to the intelligent Madras Dresser who assisted me in my military hospital, I was told that the regiment had suffered from such a type of Cholera in Madras some years previously; and he showed me, in some of the older men, huge cicatrices in the right iliac

fossa, evidently caused by some powerful escharotic. I counter-irritated so decidedly in the case of our Chaplain that, for years afterwards, he struck his side whenever we met.\*

6. At vol. i. for 1883, page 407, I have given cases by Dr. Geddes and myself, which might be regarded as examples of true Cholera, save that rice-water stools occurred in the course of Fever.

Under this head we must class a type of Fever (some considered it to be true Cholera—which it assuredly was not) described by Dr. Murray in 1840† as the “Malwa Sweating Sickness.” The attack commenced with rigors or chilliness, followed by dull headache, increased heat of skin, and dilated pupils, a burning sensation at the epigastrium, with restlessness and thirst, and generally copious watery motions smelling like the flesh of carnivorous animals slightly tainted. In many cases there was vomiting of a similar fluid, with cramps in the extremities; and the skin soon became bathed in perspiration. There was great oppression in breathing, with anxiety and præcordial uneasiness and weak rapid pulse. At the commencement, there was prostration of strength, with a feeling of exhaustion; and afterwards there was real debility, sometimes extending long into convalescence. In the severest forms of the disease, all bodily uneasiness soon ceased, except that arising from the thirst and the pectoral oppression; the perspiration continued excessive and became cold. The mental faculties remained clear till towards the end, when, coma gradually intervening, death sometimes ensued within ten hours of the commencement of the attack. Vomiting and cramps were neither constant nor prominent symptoms; but, in the severe cases, no urine was passed, nor was there any bile in the evacuations till reaction ensued.

When the disease took a more favourable turn, the pulse became more full and the præcordial oppression diminished; some dark green fæculent matter was passed by stool, a little urine was secreted, and the patient slept. If the case did not proceed at once to convalescence, the pulse did not become natural, the pupils remained sluggish, there was

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\* Although he does not describe this type of Cholera, Annesley refers to this mode of treatment (“Sketches,” 1829, page 157): “A nitric acid blister has been strongly recommended, and I have given it a full trial,” . . . “it always made an eschar.” “Scalding water has been recommended as a blister.” As in Cholera the gravest incidence of disease is always upon the lower part of the ileum, I think that we should never fail to apply strong counter-irritation over the right iliac fossa. I always did so.

† *Madras Quar. Med. Jour.*, vol. ii., page 77; and vol. iii., page 807.

anxiety, and the skin continued muddy and strongly perspiring.

After a remission of twenty-four or forty-eight hours, sometimes anticipating by two hours, the same train of symptoms was apt to be renewed. The skin became dry at first, and sometimes hot; the burning sensation in the epigastrium recurred, followed by two or three watery nauseous stools, and great exhaustion of strength; and, although the skin became cold, the perspiration increased. There was occasionally wandering of the mind, but extreme collapse, with a state approaching coma, was more common; and these increased after each periodic exacerbation or paroxysm if the case was proceeding unfavourably. There were never any cramps after the first attack, and vomiting was also less frequent. The appearance of the stools was brown, green, or yellowish—the latter being most favourable.

As the disease went on, remission succeeded the paroxysms with a regular periodicity. When the patient was to recover, the attacks became more slight, and sometimes convalescence was rapid, without leaving any organic derangement; but, when the disease was of a dangerous character, the collapsed and comatose states were more prolonged after each exacerbation, and sometimes the patient never rallied after they came on. One patient remained three days in a state of coma, yet ultimately recovered; in one case convulsion preceded it, and in two others it came on after very acute pain in the region of the kidneys, which appeared to be spasmodic, as it subsided suddenly. In several cases uneasiness was complained of about the heart, and continued for some time after convalescence was established. Dr. Murray was strongly inclined to think that this was caused by the formation of coagula in some of the heart's cavities.

In commenting on the above report, Dr. Corbyn wrote very curtly, that this disease, "of a periodic remittent character, attended with a peculiar fœtid perspiration connected with a depraved condition of the blood, is nothing more than a modified form of Cholera which has occurred in various situations in India, but especially at the Presidency" (Calcutta). This disease (which Dr. Murray, Senior, designated "Febris Remittens Choleroidea") has, however, shown itself repeatedly elsewhere, and has been generally recognised by those who witnessed its ravages as a Pernicious type of Remittent Fever.

In the following example, this fever appeared during the prevalence of Cholera in the regiment, and may almost be regarded as a hybrid of this disease. This history is one

of singular interest as showing the close relationship which exists between Pernicious Remittent and Cholera.

In November, 1840 (nearly contemporaneously with the appearance of the "Sweating Sickness" at Malwa), a wing of H.M.'s 4th Regiment were in camp, Cholera having prevailed at headquarters, near Bellary, an inland station centrally placed between Madras and Bombay. Drunkenness was prevalent, and the men were exposed to the sun and to the chilly nights without adequate clothing. Throughout the preceding month there had prevailed an aggravated form of Remittent Fever "of a highly sthenic character, presenting many of the features of the Ardent Remittent of the West Indies." The fever now, however, became congestive, manifesting a strong tendency to terminate either in sudden cerebral effusion or in prostration and collapse. Mr. W. Parry says that, in most instances, it was ushered in by dull pain in the head, giddiness, nausea, oppression at the præcordia, thirst, restlessness, and a feeling of extreme exhaustion; the countenance was either dull and heavy, or anxious. There was seldom much febrile reaction, and the pulse was mostly very weak and small. Death was ushered in by sudden prostration and collapse, sudden sharpening of the features, and a severe, but undefinable, sense of uneasiness and suffering at the præcordia, attended by frequent sighing and extreme jactitation. Soon after this, two or three watery evacuations were passed in rapid succession, and these were instantly followed by extreme collapse. The body became all at once deadly cold and covered with a clammy, unhealthy sweat. Pulse almost imperceptible. Drowsiness supervened, and soon terminated in fatal coma. The above was the type assumed by the disease in worn-out and intemperate men. In more youthful and unbroken constitutions, and indeed in the more ordinary type of this fever, there was generally much greater febrile and vascular development, and a greater tendency to assume a very irregular periodic type, most frequently an irregular quotidian or double tertian. In two men, after what appeared to be a complete intermission for two days, the paroxysm commenced with severe convulsion—in one, ending in paralysis and coma, fatal the next day; in the other, merging in long-continued stupor, which passed off by very slow degrees. In other cases, in which the disease had observed considerable regularity for three or four days, instead of a recurrence of the regular paroxysm at the anticipated hour, there was sudden collapse, the body became cold and covered with clammy, unhealthy sweat, the limbs and countenance purple, and the circulation nearly arrested.



This profound collapse occurred in one individual at nearly the same hour for three successive days, after which he gradually recovered.\*

At page 266, vol. i. for 1883, I have cited the description of the leading features of an outbreak of Pernicious Remittent, which occurred in H.M.'s 6th Foot, stationed at Deesa, Bombay Presidency, in September and October, 1835. In many of these cases there was deadly collapse.

“With this sudden sinking there sometimes existed internal heat and thirst. The extremities were often deadly cold, while the trunk was warm.” In some cases there were “evening exacerbations, somnolency, immobility of pupils, or bilious vomiting and watery purging two or three days before death.” “In other cases, of considerable severity at first, there were nocturnal perspirations so profuse as to drench the bedding.” Dr. R. Brown also described this outbreak as it occurred, at the same time, at Deesa in his troop of Horse Artillery. His description of the disease fully agrees with that by Dr. Jackson, of the 6th Foot, which I have cited. After two or three days of suffering from a sense of extreme exhaustion, there would be a few rigors, with shrunken features, oppressive headache, epigastric weight and tenderness, with much nausea and ineffectual retching, followed by some reaction, raised temperature, acute headache with occasional delirium, bowels generally torpid, nausea constant, retching distressing, sometimes followed by vomiting of dark-coloured fluid. This stage was very uncertain in duration, sometimes partially remitting and again returning. At length perspiration would break out, happily sometimes warm and general, bringing relief of all the symptoms for a time: sometimes, not unfrequently, partial, cold and clammy, without relief of symptoms, with continued irritability of stomach; feeble, quick, compressible pulse; great depression of spirits; occasionally involuntary passing of watery stools; urine scanty, dysuria. In many cases this condition, which seemed almost to amount to irretrievable collapse, continued for a long time, and would be succeeded by a reaction, generally less strong than the previous one, but marked with symptoms of congestion of liver, spleen, or brain; and this process would be again gone through until the disease was subdued.

7. Last in this progressive series, which has not, I believe, been thus fully traced out by any preceding observer, is the fully developed expression of Pernicious Fever in Malignant Asiatic Cholera.

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\* *Ind. Jour. of Med. and Phys. Science* for 1842, page 289.

Several authorities—Hutchinson, Searle, and others—held, long before I went to India, that Cholera is Fever, the gravest development of the potency of marsh poison. Many of our data are in favour of this opinion, and I doubt if there is any fact in its history which is irreconcilable with this view. At the same time I do not think that, considering the large means of research, upon the lines so ably followed by Drs. Lewis and Cunningham, still open to us, we should be justified, at present, in adopting this or any other theory of the cause of Cholera. I shall continue to watch the quest for the “Cholera germ” with a perfectly open mind, equally prepared to learn that, if such an organism really exists—which appears most doubtful—it is a hitherto undetected microzyme, or the at present rather slighted *Bacillus Malariae*.

If we accept the opinion that Cholera is a Pernicious Fever, we must not expect to find that it is either contagious, as small-pox is, or that it is propagated from individual to individual, as a specific poison, as syphilis is.

All my large personal experience of the disease in Bengal—its home—and all that I have read, confirm my belief that the essentials to its occurrence are (1) an atmospheric or telluric condition, epidemic or endemic, due, it may be, to some undetected abnormality in the air or in the earth—electric, volcanic, or other—or to the presence of some un-demonstrated microzyme or germ, which predisposes those who live within the area of its occupation to cholera; and (2) an exciting cause, such as panic, fatigue, want, or unwholesome ingesta,—say, a dose of Epsom salts, putrid fish or meat, crude fruit, or water impregnated with various impurities, such as cholera excreta, etc., etc., etc. No one has proved, to my satisfaction, that cholera stools contain *a specific poison* capable of propagating cholera to those who swallow it. True, some of the facts which are adduced in support of their doctrine by those who hold that cholera is propagated exclusively by cholera stools, are striking: but these facts are very few, considering the great prevalence of the disease and the vast number of those who have studied it practically; and, carefully sifted, the strongest of them fall short of absolute demonstration. Thus great weight is given to the fact that, in one of the later visitations of this metropolis by Cholera, the ravages of the pestilence were signally incident upon the East of London. Upon special inquiry, more than one of our best sanitary authorities discovered that, when the disease was most active, the inhabitants were drinking unfiltered water from the river Lea; and that, at the same time, this water had received cholera stools. This is a

showy fact, but it quite falls short of demonstrating that a specific poison in water caused this outbreak, seeing that, whenever pestilence has visited London, its incidence has ever been most heavy at the East-end, where poverty and sanitary neglect, in a marshy atmosphere, have always prevailed,\* and that filthy drinking-water has always been recognised as a valid *exciting* cause of cholera,—as a strong solution of Epsom salts also undoubtedly is.

Mr. Macnamara states† that the following remarkable accident occurred within his own observation:—A small quantity of a fresh rice-water stool, passed by a patient suffering from cholera, was accidentally mixed with some four or five gallons of impure water, and the mixture exposed to the rays of the tropical sun for twelve hours. Early the following morning nineteen people each swallowed about an ounce of this contaminated water. Within thirty-six hours five of these persons were seized with cholera.

This again is a striking fact. Still, it quite fails to prove that the rice water cholera stool contains, and is capable of communicating, when swallowed, the specific poison of cholera, as the virus of syphilis and variola contain, and, when inoculated, communicate, those two diseases. Indeed, the fact that scarcely more than 25 per cent. of those who swallowed the poison became the subjects of cholera may be received with surprise by some that so many escaped, may be viewed by others as an evidence that no poison was swallowed, and must be received by all as proof that, if cholera stools do contain a specific poison of cholera, that poison is far less sure in its action on the system than various recognised specific poisons are. Thus, if three groups of persons (1) took scruple doses of arsenic, were (2) inoculated with small-pox, or (3) with syphilis, it can hardly be doubted that more than 25 per cent. of each party would manifest the specific action of each of these three poisons.

Then, should it be argued by one unacquainted with the

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\* In illustration of this point, I may as well quote *verbatim* the words which I used in November last (*Medical Times and Gazette* for November 11, 1882, page 577), when speaking of the general unhealthiness of East London, without having my attention at all particularly directed to the subject of Cholera:—“We read that, in the first year of Charles the First, Stepney lost 2978 persons by the Plague; and that in 1665 Plague again appeared there, and, according to the parish clerk’s account, swept off 6583 persons.” . . . “It is stated, in the ‘Life of Lord Clarendon,’ that ‘the Plague had swept away so many seamen (Stepney and the places adjacent, which were their common habitation, being almost depopulated) that there seemed to be an impossibility to procure sailors to set out the fleet.’ Stepney lost a character for salubrity, which it had somehow obtained, when, in 1844 and 1866, many cases of cholera occurred in its neighbourhood.”

† “Cholera,” Quain’s “Dictionary,” page 240.

natural history of Indian Cholera, that the fact that so many as five out of a party of nineteen were attacked with Cholera, creates strong suspicion of cholera-poisoning, I shall presently give a case, by Dr. Macpherson, in which five out of eighteen inhabitants of a house were attacked with cholera, three fatally, when there did not exist any evidence or suspicion of cholera poisoning. So, too, many cases have been adduced in which pilgrims, travelling in the course of a cholera epidemic, reached a town and were attacked with cholera, whereupon cholera appeared in that town. To this argument of the propagationists their opponents reply by inquiring, Would not the epidemic have appeared in the town, precisely as it did, if the pilgrims had never come? Does the admission of a cholera patient to a hospital impest that hospital with cholera?

In considering this question, it is noteworthy that nearly the whole of the Indian authorities who believe that cholera is communicable by the dejecta judge from their experience of *epidemic* cholera in the North-Western Provinces; whereas nearly all who have long worked in Lower Bengal, the fixed *endemic* area of cholera, doubt that this disease is at all communicable from man to man.

Thus, only a day or two ago, a brother officer, of remarkable distinction, who has retired after long service both Up Country and in Lower Bengal, told me that he long sought in vain for an instance of a servant who had got cholera in the wards of a cholera hospital. At length he found a *napit* (barber) who had been attacked under what appeared to be suspicious circumstances. To the inquiry, "Have you been shaving cholera patients?" he replied, "I never shaved a cholera patient."

During fifteen years, with some breaks, in which I was Senior Physician of the largest hospital in India, which was rarely free from cholera cases, no medical officer, nurse, or native hospital attendant (altogether a large body) was attacked with cholera. When I first assumed charge, *all the cholera cases were treated in the general wards*, side by side with the other sick. After some years, I fitted up a cholera ward for men; but, up to the day on which I left India, I could never obtain separate accommodation for the women. Still, in those fifteen years of never-ceasing cholera prevalence, I can recollect no patient who was attacked with cholera in hospital, with the exception of Willie Marshall, a little patient of my own. Therefore there is nothing in my own experience that favours the opinion, entertained by many, that every cholera patient is to be regarded as a centre from whom pestilence radiates.

At a recent meeting of the Epidemiological Society, Dr. Cuninghame stated that he had collected nearly eight thousand cases of cholera attendants, of whom only 150 were attacked,—these, like all their neighbours, having to share the danger. Dr. De Renzy replied that it had been known that soldiers, told off to attend their sick comrades in the cholera wards of European corps, suffered largely. Here it should be borne in mind (1) that, when epidemic cholera attacks a European regiment, *all* are in great danger; that, (2) gallant as the English soldier generally is in battle, and devoted as he is in attention to his sick comrades, the first outbreak of cholera pestilence always raises panic—a strongly predisposing cause—throughout the regiment, especially when the medical officers are propagationists; whereas (3) work with cholera patients, which he knows by experience to be unattended with the slightest danger to himself, is the daily business of the native hospital attendant, who, although not courageous, generally has fair good sense.

At the Calcutta Medical College, I had a little town within my walls, numbering, at mid-day, upwards of two thousand inhabitants, a very large majority of whom were in some way concerned with our very numerous cholera sick. Our sanitary arrangements were fairly good, but very far from perfect, seeing that the hospital was a faulty building, standing in a nice, but narrow, open space in the heart of a dense and most noisome bazaar, containing a little Venice of open sewer cesspools. In fifteen years, one patient was attacked in the hospital of 300 beds,—no attendant. In the adjoining College, one student was attacked, but no servant. This, in a city where cholera rages as a pestilence for four months in every year, and from which the disease is never absent. I look upon those two cholera cases merely as our share of suffering from the cholera influence which hung constantly over us throughout all those fifteen years.

Then, with regard to my own personal and home experience (which is also the experience of thousands of other well-to-do Englishmen, their wives and children, who lived in Bengal while I did),—in all those years, although we were certainly very scrupulous in choosing the best drinking-water, and in having that filtered and boiled, it cannot be doubted that, if there be a cholera poison—which, if it be a solid or a gas, must exist abundantly in the horrible dust (Budd) and fog of Calcutta—we must have taken it into our systems almost in everything that we swallowed and in every breath we drew, to say nothing of the fact that, during more than half my long service in India, we lived, with

windows open day and night, less than a hundred yards to leeward of a cholera hospital.

All those who think as I do on this subject are constantly saying to the propagationists, "You are too ready to read *cause and effect* where we merely recognise *striking coincidence*."\* Still, as the opinion that the disease is propagated by water containing cholera dejecta is held tenaciously, at this moment, as a guide in preventive legislation, by many physicians of great experience and scientific eminence, and as the question is one of such great importance to suffering humanity, I have no hesitation in stating my opinion that it ought, should Cholera arise among us here, to be put to a crucial test "*in corporibus vilorum*." As this disease is not proved to be communicable to the lower animals, and as the anti-vivisectionists would probably not allow us to make experiments if serious doubt remained, the Government ought to be moved to permit it to be tried upon criminals condemned to death. As these poor creatures would be well attended to, I believe that, even if it be true that the dejecta contain and communicate the specific poison of cholera, at least three-fourths of their number, if not all, would escape with life.

Until this is done, and afterwards, I shall retain the belief that, on every ground, we should as far as possible avoid swallowing cholera matter, not because I consider that this is the specific poison of cholera, but because it is a putrid irritant which is likely "to disagree," and so to become an *exciting* cause of cholera, as Epsom salts and putrid fish unquestionably are.

The discovery of the cause of Cholera will probably never be vouchsafed to a man of narrow and one-sided views. I believe that nothing valid will be revealed to us unless we grasp and correlate *all* proved facts. He who enters upon the quest must recognise no opponents. All working in the field must be regarded as fellow-labourers and helpers, save those who are absolutely ignorant or dishonest. He who is so happy as to grasp the truth will certainly perceive that it is reconcilable with all the good work of men holding all opinions. "Why," it may be said, "you affect broad views, while you are really a bigoted anti-propagationist!" My reply is, "Not so; I am an agnostic, with a strong anti-

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\* Mr. Froude has lately recalled Luther's commentary upon astrology. "It is like dice-throwing. You say that you have a pair of dice that always throw twice six—you throw two, three, four, five, six, and you take no notice. When twice six turns up, you think it proves your case. The astrologer is right once or twice, and boasts of his art. He overlooks his mistakes."

propagationist impression, which may possibly be removable, but which is quite unshaken at present."

As I have already said, I have so generally noticed that those of my most experienced brother officers who have been propagationists have made their observations chiefly in the Epidemic field of cholera in Upper India, while the anti-propagationists have generally practised in the Endemic area of Bengal Proper,—a very large proportion of those whose observations have been restricted to the cholera epidemics of Europe being propagationists,—that it stands as a fair question, Is or is not Epidemic cholera propagated by the dejecta, while the Endemic disease of Lower Bengal is not? My mind has, for many years, been open to this question, which has often occupied my thoughts. But I have never seen or heard anything which, upon close investigation, shakes my firm impression that a specific cholera poison is not contained in the stools.

*Pace* M. Fauvel, I do not hold these views "in accordance with the commercial interest of my country,"\* being quite unaware what that "interest" is—save that it appears to me that, if I were a Bristol merchant, it would not be to my "interest" to see that port impested by cholera. It has never been my fortune to enjoy the rest afforded by a prolonged term of quarantine; but, having been conducted through the Alexandria railway station in five journeys to and from India, I can affirm that, adding together all the terms of my stay at that place, not three hours of my life have been spent on shore at Alexandria. I have been conveyed in what appeared to be a pig-boat to and from the steamer, and have been taken across the desert in a vehicle of bare boards which had the look and comfort of a sheep-van. I have seen an Egyptian receive a sixpenny-piece from an Englishman in the bowl of a gravy spoon filled with water; and I, together with the rest of my fellow-passengers, have been constrained by a straw-hatted official to soak and wring out, in public, the contents of my clothes-bag on the deck of a P. and O. steamer, in the shadow of Monte Christo's prison—apparently with an intention of liberating the cholera-germ, and of giving it a habitat in French waters. Still I remain absolutely unconvinced of the preventive efficacy of sanitary cordons and of quarantine in cutting off the approach of that which does not travel, and in arresting the propagation of that which is never propagated.

The following data—most of which are recognised by many, if not by all, physicians of Indian experience—may

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\* Report of a controversy in the Paris Académie de Médecine (*Daily Telegraph* for August 6, 1883).

be taken as applicable to our present threatened position in Europe. All of these conclusions are based upon many more facts than can be given here.

*If a strong epidemic wave rises among us, its destructive effects will not be wholly avoidable.* In India, good Hygiene is generally a great protective. English officers and merchants, their wives and children, are comparatively rarely attacked, their good Hygiene being their main safeguard; but, in two Indian epidemics, within my knowledge, the officers suffered greatly. So, in one of the worst small-pox visitations which I watched in Calcutta, persons whose faces were seamed by a previous attack fell victims.

*Whatever treatment may be adopted, a very large percentage of those first attacked will probably die.* It is a fact, noticed always and everywhere in India, that at the first outset of an epidemic, and when an endemic first sets in, the loss of life among those attacked is terrible, the disease having an intensity which, in a majority of cases, defies all treatment. Later, when the outbreak is on the decline, there is usually a strong tendency to recovery. This law in the disease has repeatedly led inexperienced practitioners into a very transparent mistake. One who has recently come to the country frequently makes this observation: "When cholera appeared, in February, I tried all the old remedies, but found them useless. Being almost in despair, in May, I gave Album Græcum in three-grain doses every quarter of an hour, and cured 60 per cent. of my patients!" The fallacy only becomes apparent, even to the discoverer himself, when he comes to employ his specific *at the commencement* of the next outbreak. This law receives some indirect illustration from the fact, given by Dr. Macpherson, that, in an analysis of 1354 cases of cholera in Europeans in Calcutta, "the rate of mortality during the hot or cholera months was 56·2 per cent., and 45·2 during the others."

The following data, also given by Macpherson, are still more explicit:—In the outbreak at Kurrachee, in Scinde, of the first 100 admissions 79 died; second, 66; third, 50; fourth, 40.

*In Cholera outbreaks, he who enters the Epidemic or Endemic Area encounters special danger.* In India, no one can be considered safe on first entering a cholera-impested area. Thus, when I looked around my cholera ward, the native patients generally had much the appearance of Calcutta people; but, on inquiry, it was almost always found that they were outsiders who had not been many days in the city. It was hoped that the introduction of an excellent water-supply would put an end to this, but it did not—in my time.



All travellers, Europeans and natives, from Up Country incur this liability. It is a common saying, among natives, that everyone who enters Calcutta is liable to bowel complaint;\* and I am confident that no one who arrives in Calcutta from Europe can regard himself as being perfectly free from danger of an attack until he has passed through a cholera season. The Europeans who die of this disease in Calcutta are mostly sailors, lately arrived in port, and other new-comers. Hence the necessity for moderate care in living during the early months of residence in India.

The works of Dr. John Macpherson, the "Annals of Cholera" and "Cholera in its Home," which may, at this crisis, be studied throughout with the greatest interest and profit by every medical man in this country, contain important illustrations of this law, among the most striking of which is the following†:—

"A first-class ship arrived in the Hooghly in the early days of January. There was no cholera in the vessel coming up the river, or during the month after its arrival. There was very little in the city of Calcutta." [Still, there is generally a brief cholera season at about that time in Calcutta.—N. C.] "A party, consisting of a gentleman and his wife, a European nurse, a young lady, and two children, landed from the ship in perfect health on a Sunday. They went to a house in which there had been no cholera for several years—not, however, in a good situation (Circular-row, opposite to Elysium-row), and small for the party that was received in it. After their arrival, there was a total of eight adults and ten children in the house. Of these, two adults and three children were residents, two adults and three children were arrivals from up-country, and the rest were the new arrivals. Five of the new arrivals occupied a small room on the upper flat—that is, three females and two children,—they had one bathing-room off it. The rest of the occupants of the house were partly upstairs and partly down. The nurse and children appear to have had slight diarrhœa during the week, and the young lady ate on Saturday some indigestible food. The children, having slight diarrhœa, got a dose of Gregory's powder from the mother on Sunday morning. I was sent for at 8 p.m. of that day, and found one child far gone in cholera; she died at half-past twelve at night. The other

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\* So also it was observed by a medical officer, long resident there previous to the Mutiny—I think Dr. John Balfour,—that the water of Delhi was so bad that nearly every European who went there was attacked with some disorder of the bowels.

† "Cholera in its Home," page 36.

child was in the earlier stage of the disease. About midnight the father had an attack, which was checked; and, towards morning, the nurse was seized. She was sent to the General Hospital close by at 7 a.m., and died at 7 p.m. All who could possibly leave the house (all but its resident occupants) were ordered out of the house. The young lady, who had been in devoted attendance on the children, went to Wilson's Hotel. There she was seized on Monday night, and died at 4 p.m. on Tuesday. The second child eventually recovered. One of the occupants of the room downstairs was at the time suffering from chronic diarrhœa, but he was not attacked. No more cases occurred in the house or in the servants' outhouses."

Here, as Dr. Macpherson observes, the sufferers had just arrived from sea; and it may again be just worthy of notice that, almost precisely as happened in Mr. Macnamara's case, where, of nineteen persons who swallowed water polluted by cholera excreta, five were attacked with cholera, so, of the eighteen inmates of this house, five were also attacked.

A very few days after the 19th Regiment arrived in Calcutta, early in the Mutiny, my friend Professor Longmore, of Netley, took me to the bedside of an officer who had gained remarkable distinction in the Crimea, and was known as "the Boy Colonel." Colonel R. landed his regiment about Christmas time (when, as we have seen, there is always a tendency to a brief cholera outbreak). In his first arrangements for his men, he had great mental anxiety and bodily fatigue. He sank in a few hours in the collapse stage.

"*The incidence of Cholera will always be heaviest upon the most insanitary localities.*" I have endeavoured to state this generally recognised law in the words used by that great sanitarian, Mr. Edwin Chadwick, at a meeting of the Epidemiological Society on the 4th of July last.

As I have already mentioned, well-to-do ladies and gentlemen, who have resided for more than a year in Calcutta, or elsewhere in India, are rarely attacked. When they are, it is usually found that they inhabit certain notorious spots—such as Lall Bazar and its vicinity (the unhealthy quarter most frequented by sailors), the old town around Tank-square, and the site of an old filled-up tank in Chowringhee. My friend, Dr. Wilson, kept in his study a map showing every house in the place, on which he marked the houses where cases occurred within his experience. It was in such localities as the above that his black marks lay thickest. We inhabited, for some months, a house which, at first sight, appeared to be delightfully situated, but which I soon found to be surrounded with insanitary

influences. When I left, on the occurrence of a case of grave remittent fever, I was told that the house was notorious for cholera ; and I know that, in the course of a few years, two well-to-do Europeans died in one of the rooms.

Dr. Macpherson mentions\* an instance which was known to every medical man in Calcutta. Many years ago, certain large palatial houses in Middleton-row were almost deserted, being considered a hot-bed of Cholera. The site had been occupied by a large tank in Sir Elijah Impey's park, which had been filled in, doubtless after the old manner in Calcutta, with every kind of filth and refuse.

Next we have the well-established fact that *it is dangerous to travel in the Cholera area*. Hence it is that pilgrims, who endure the most terrible exposure, privation, and fatigue, appear so prominently in the history of Indian Cholera. The natives have a saying that the widow who goes upon a pilgrimage, performs as great a sacrifice as she who is burnt on her husband's pyre. *Those who are well lodged and in comfortable circumstances have a great prospect of escape, if they remain at home*. Well-to-do Europeans, resident in Calcutta, suffer very little from cholera, but travellers undergo great peril of that disease, even when there is but little fatigue, privation, or exposure. A late venerable archdeacon, who had enjoyed good health for many years in the Cholera atmosphere of Calcutta, went up-country on visitation, and died of Cholera at Ghazipur. The only member of our rather large European community who suffered when Epidemic Cholera visited Chittagong, in 1849, was the chaplain. He came in from Tipperah, when Cholera was raging in my jail, ate a hearty dinner, went to bed, and was almost immediately attacked. His was a very severe and typical case, and recovery was difficult. The following case also came within my own notice. Two young married ladies arrived at Calcutta by the same ship in the cold season. One of them remained in Calcutta nearly three months, and then accompanied her husband from our house at Howrah, in high health and spirits, to the barracks at Chinsurah. This was early in the Cholera season. Meeting the other lady in the neighbouring town of Hooghly, she accompanied her friend to church on the first Sunday after her arrival. Both were attacked with cholera on that day, and both died. A year or two subsequently to this, a lady, long resident at Chinsurah, came down on a visit to a relation living in one of the best situated houses in Calcutta. She was immediately attacked with fatal cholera. This lady's husband

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\* "Cholera in its Home," page 22.

subsequently left Chinsurah, and was stationed, for a short time, in Burmah. He died of cholera on his return to Calcutta. Such cases are known to every officer of Indian experience.

Within the last few months, I heard of a case illustrating this law. A wealthy lady had made a tour through India, and, having come down to Calcutta from the Upper Provinces, invited a friend of mine, who called on her arrival, to luncheon on the following day. Previous to that time she was fatally attacked by cholera.

In old times, within my recollection, occurrences like the following were frequent in India. A party of healthy European soldiers would be embarked early in the morning at Chinsurah on a well-found troop-boat, towed by a steamer. On arriving at Fort William, Calcutta, at midday, several men, dying of cholera, would have to be landed and taken to the General Hospital. Again, a vessel, conveying coolies to the Mauritius, would leave Calcutta with all on board healthy. Cholera almost inevitably appeared, with more or less severity, before the vessel passed the Sand Heads, 110 miles down at the mouth of the Hooghly, and ceased when she was once fairly at sea. When it was customary to send European soldiers up-country from Bengal on country boats—which, when not overcrowded (as they too often were), were comfortable and wholesome,—the results were frequently most calamitous. An account of one of the latest and most disastrous instances—that of H.M.'s 87th Royal Irish Fusiliers, in 1849—is detailed in my work “On the Means of Preserving the Health of European Soldiers in India.”\* Between September and the following March, this fine regiment, 1036 strong, lost, on their way up, from cholera, dysentery, and fever, 217, exclusive of 1 officer, and 29 women out of a strength of 73, and 29 children out of 103. In the above-mentioned work are cited at length several instances illustrative of the law that native troops, when embarked on country boats, were almost invariably attacked with Cholera, as in the case of the 8th Native Infantry, who, on the voyage from Cawnpore to Benares, at the end of August and beginning of September, 1856, lost, in seventeen days, 42 men out of a strength of 1115. Nearly all authorities agreed that these outbreaks of cholera, among Hindoo troops, were dependent mainly upon the use by the men of ill-cooked nutriment—such as *chobanee* (parched rice) and soaked *gram* (horse beans). I feel confident, however, that these parties merely fell under a law in Cholera to which men of all habits

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\* *Indian Annals of Medical Science*, No. x., page 706.

and races are alike subject. Raw rice and beans could not cause cholera, they could only *excite* it; and we see that European soldiers, to whom these articles of native diet were unknown, suffered precisely as the natives did.

Here we come upon a concurrent law, the explanation of which has perplexed many. *Whenever Cholera attacks a barrack or jail, the surest means of staying the pest is to remove those who are still well to a judiciously chosen camping ground.* We did this when my jail at Chittagong was very severely attacked by epidemic cholera in 1849. Not a single case occurred after the prisoners were promptly removed to camp. Mackinnon gives an instance in which, Cholera having broken out in a Queen's regiment in Fort William, part of the wing of the regiment was moved to Chinsurah Barracks, with the best effect. Upon this interesting point Dr. John Murray's paper "On Removal in Epidemic Cholera"\* should be consulted. It is mainly due to native recognition of this law that so many ruined villages are noticed in travelling through the swampy districts of Lower Bengal; and that every large city, like Dacca, is observed to be environed by a wide belt of hut foundations.

Those European and Indian observers who contend that a Cholera patient is a focus whence the disease will radiate by the admixture of Cholera dejecta with drinking-water or with dust, urge that seamen and pilgrims, coming from Cholera-impested places, convey the disease to healthy localities, having "followed the great routes of trade," which, they consider, Cholera especially besets. This opinion is assailable on various grounds. Take the following. We know that the Cholera endemic becomes very grave in Calcutta at about the middle of February. Let us, for the sake of argument, assume the possible case that epidemic Cholera will begin to prevail in England at precisely the same time. John Smith, sailor, arrives from Alexandria, which is impested by Cholera, at Southampton, or at any other English port, on February 12. Wherever he arrives, he will be said to have "followed one of the great routes of trade," as probably ships from Alexandria arrive every week at several English ports. His brother, Thomas Smith, sailor, arrives, also from Alexandria, on the same day, in the port of Calcutta. Both men drink and knock about on shore, are attacked with Cholera, and die. On the following day, Cholera breaks out at both ports. Now, we of Indian experience can trace perfectly the sequence of events in the case of Thomas. He also "followed one of the great routes of trade." But

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\* *Translation of the Epidemiological Society, 1879-80.*

no Calcutta medical man will dream of asserting that he brought the endemic pestilence into that city. All will immediately agree in declaring that he fell a victim to the Cholera poison, which he found there, just as a dog dies when he is thrown into the Grotto del Cane and is choked by its gas. Why does his death precede by a day or two any Cholera death among the fixed inhabitants of Calcutta? He falls a victim to the law, illustrated by a multitude of facts like those of the cases of Colonel R —, and of the persons attacked in the Circular-road house (given at p. 17), that, in India, *the gravest and speediest incidence of a Cholera outbreak is always upon those newly arrived in the Cholera area*, especially if, as is generally the case, they be exhausted by fatigue, or be very imprudent, immediately upon arrival. Our opponents will unhesitatingly declare that John Smith brought the epidemic Cholera from Egypt to England. We “non-propagationists” will reply, as steadfastly, that it awaited his arrival in England, and that both men died under one and the same law of disease.

In the February of any year, a Calcutta medical man, addressing the sailors newly arrived, would say, “Some of you will be attacked with Cholera before this month is out, unless you are unusually prudent and careful.” At a time like the present, our port authorities ought to have all recently arrived sailors duly warned and instructed where they can, with the utmost ease and readiness, obtain medicine gratis, whenever they are attacked with bowel disorder.

#### *Exciting Causes of Cholera.*

Principal among these are *all causes tending to produce nervous depression and exhaustion*—want, excess, exposure, fatigue, panic,—and *everything which, in popular language, “disagrees” with the stomach*. A circumstance which almost invariably attends cholera, dysentery, and the gravest forms of diarrhœa in India is that, immediately the morbid process sets in, the stomach signally fails in its power to digest, and that more or less suspension of digestive power frequently continues far into convalescence. Hence the fact that, in cases of subacute (commonly termed “chronic”) dysentery, when the patients are imprudent, as they mostly are, nearly every kind of undigested food may be looked for in the stools. The Chaplain of Chittagong, whose attack I have already alluded to as having occurred soon after he had dined and gone to bed on returning from a journey, while epidemic cholera was raging in the station, vomited his plentiful meal of beef and potatoes entirely undigested, although there had been quite time enough for digestion.

I carefully examined the vomit: meat and vegetable, which had been bolted hungrily in great masses, appeared quite unchanged. It appeared astonishing that keen appetite could have existed in such a condition of the system. We generally dine late in India, but those who are prudent *never eat fruit at night*. This is best taken at breakfast. All experience shows that Europeans are generally attacked with Cholera at night or in the "small hours," and natives after a full meal.\*

I have already alluded to the fact that most of the inmates of my cholera ward in Calcutta were strangers, attacked shortly after their arrival in Calcutta. It was believed that their disease was excited by *drinking foul water* from filthy tanks, in their ignorance of better sources of supply. The majority of European cases in that institution were sailors lately arrived in port, who had been imprudent on landing, and who were frequently known to have drunk Hooghly water, taken up over the ship's side, which is often brackish, and which is always contaminated with every kind of city filth, probably including *cholera excreta*. I have already mentioned that an officer told me that he and a brother officer, having duty in an Up-Country bazaar, became so much heated and fatigued that they went into the shop of a native dealer, and asked for two pint bottles of ale. His companion emptied his at a draught. That which was poured out for my friend was so horribly decomposed that he rejected it, and asked the other how he could swallow such stuff. The reply was, "I was so thirsty that I could have swallowed anything." The poor fellow was attacked with cholera on his return to quarters, and died. An administrative medical officer, when travelling from the plains to a hill station, suffered much from thirst and, unguardedly, drank milk not long after drinking beer. He was, soon afterwards, fatally attacked with cholera. A very healthy gentleman and his wife, friends of mine, were, during part of the Mutiny, shut up in the fort at Allahabad, the sanitary condition of which was then most evil, where they endured considerable privation. As the danger lessened, the refugees were removed to neighbouring places in detachments. Mr. H—— and his wife were separated, and died of cholera in a few days, neither hearing of the other's fate. Here this disease, which prevailed sadly among the refugees, was attributed to too great freedom in eating meat, fruit, and vegetables, of which they obtained large supplies. One of

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\* Macpherson.

the few cases of European ladies who were attacked with cholera in Calcutta during my long residence there, was one who lived in a distant suburb, Alipore, and whose seizure followed a rather fatiguing morning shopping in the town, after which mangoes were eaten freely.

I attended with a brother officer the fatal case of an English lady attacked during her first cholera season in Calcutta, after having breakfasted upon corned ox-tongue. A European man recovered, in my ward, from cholera caused, as he believed, by eating corned beef. It was thought that the lower class of butchers employ arsenic in "curing" tainted meat. *Strong purgatives, especially Epsom Salts or other hydrogogue cathartic salines*, are so notorious as exciting causes of cholera, that I, throughout my career, never gave salts or seidlitz powder. According to Indian usage, *I never gave any purgative at night*. I was called by a medical man to visit his mother, who was attacked with cholera after taking a dose of sulphate of magnesia. One of my last fatal cases in the country was that of a poor European woman, in whom the attack was excited by a dose of well-known "antibilious" pills.

#### *Variation in the Types of Cholera.*

It is needless in the present day, with the works of such observers as Macpherson, Goodeve, and Macnamara before us, to enter into a description of the common and unmistakable symptoms of Malignant Cholera—the stage of Premonitory Diarrhœa, when it is present; the Stage of Algide Collapse; and the stage of Reaction, with its perils from arrest of hepatic and renal excretion. As I emphatically observed of Indian Fevers that *the type changes incessantly*, so it is with Cholera. I always noticed a distinctly marked variation, not only in the type of each outbreak, but also in the condition of each patient—every man's case has its own distinct individuality. Consequently, no disease stands more in need than Cholera does of special treatment according to the peculiarities and exigencies of every case.

This is a law which every observant man will be able to read clearly soon after the disease comes before him, and which is laid down by Dr. Macpherson in the following pithy words:—"In all essentials the disease is the same as when it first broke out"; but then "all observers are agreed that the cholera of one season varies from that of another, just as the character of fever changes. Some of the most striking variations are the degree of blueness of the skin, the early occurrence of collapse, the amount of vomiting and purging, or of cramps, the frequency of consecutive fever,



the degree in which the disease is amenable to treatment." To these variations may be added an appearance of bile or blood in the stools, great differences in the condition of the mucous membrane and follicles of the ileum, especially as regards vascularity and exudation, a tendency to the formation of ante-mortem clots in the right heart. In one outbreak there will be a prevalence, as we begin to hope that our patients are safe, of sloughing of the cornea, which first becomes dull and sunken, evidently from arrest of nutrition. On another occasion there will be a tendency to sloughing of the scrotum. We cannot, at first, judge whether the occurrence of the stage of reaction will be early or late. In one autumnal outbreak, patients remained collapsed for three days. The tendency to serious head-complication in the stage of consecutive fever varies greatly; so also does the disposition to retention of the first urine when the bladder is full. Cholera spasm or cramp is not very common or excessive in the weak-muscled natives of Lower Bengal (who endure tetanus much better and longer than Europeans generally do) or in women. I have often thought that the fatal result was determined, in strong European sailors, by the severity of the cramps. I had two sailors lying side by side—one a perfect picture of healthy athletic muscularity; the other sickly-looking and meagre. I could only account for the death of the finer man and the recovery of his comrade upon this ground. I did not see, in Bengal, that muscle-tearing cramp which has occurred in England.

I cannot quite understand with what view the authorities, in 1840, added to the Bengal Medical Return the disease *Cholera Biliosa*. By this they may have intended to designate a form of malignant Cholera in which the stools are bile-tinged. I saw one of these fatal cases in Calcutta, and heard of another—the two examples occurring more than twenty years apart. Dr. Morehead found these cases rare. I do not think, however, that it was intended to set apart this very exceptional form of the disease, because, I repeat, it is, self-evidently, true algide Cholera wherever it occurs.

The separate heading was, doubtless, intended for those cases of violent—but, in my experience, always safe and transient—*Bilious Flux*, perhaps attended with vomiting, which are frequent among Europeans at the end of the Cold Weather, just as the Cholera Season is setting in. The liver, having been rather congested during the cold weather, suddenly relieves itself by an enormous flow of bile, which produces considerable prostration, and still more alarm. The first case I saw was treated by a native Sub-Assistant-Surgeon, who gave a scruple of calomel and the same

quantity of soda. After taking this, the patient went to sleep, and was nearly well in the morning. After this I used to give the soda without the calomel;—indeed, the disease relieves itself. I used to notice that one of these thorough purgations generally left a peculiarly clean tongue, not raw, but perfectly moist and healthy. Many, when I first went to India, called this “Bilious Cholera,” and I suspect that many of these cases—all of which were “cured”—were included under the head of “Cholera” in the old returns, previous to 1840, with serious detriment to the accuracy of their Cholera death-rate.

Cholera is often, but not always, ushered in by *Premonitory Diarrhœa*. This can generally be arrested and an attack of cholera prevented by the timely use of opium. Wherever cholera was prevalent in an out-district, we used to send to all the police *thannas* large stocks of “Cholera Pills” of which my friend Dr. Waring gives the prescription in his excellent work on “Bazaar Medicines”—opium, black pepper, and assafœtida, of each twenty grains; beat them well together and divide into twelve pills: of these one was the dose, repeated every hour if required. With a view to speedy solution, we used to give these broken up in a tablespoonful of brandy-and-water. These pills used to be in high repute. I generally gave twenty minims of laudanum in a draught with chloric ether, sesquicarbonate of soda, chalk mixture, and cinnamon-water. *Omum Water*, distilled from the seeds of *Carum* (*Ptychotis*) *Ajowan*—(Waring),—is much used as a carminative vehicle in the Madras Presidency.

#### *Cholera Simplex*

Is readily distinguishable in a country like England, where malignant cholera does not appear except as an epidemic, save when a not unquestionable sporadic case occurs once or twice in a lifetime; but in Bengal, where true Cholera is constantly endemic, it is sometimes hard to differentiate the two maladies save upon a retrospective view. We are told that a patient is dying of cholera, and we find him with or without vomiting, and passing thin, copious, and almost colourless stools. He is greatly alarmed, nearly algid, and very low; has a thread-like pulse, and complains of spasms. At first sight, this may be a case of cholera. We give a dose of opium—the patient sleeps, and does well. It is noticed in these cases that there are never the characteristic rice-water evacuations of cholera. The radial pulse is not arrested for hours, and there is never true collapse. An elderly man of great scientific eminence, retired from long and very arduous service in India, suffered from most intractable chronic

white diarrhœa, which was probably true Hill Diarrhœa. He remained for upwards of two years and a half in a healthy midland English town, very slowly but decidedly losing strength. He was certainly not careful as regarded his diet, and he travelled a good deal. In his second summer at home, the weather being very hot, I received a telegram saying that he was dangerously ill. I could not reach his house until after midnight. He was lying on his side, as those about him thought, in calm sleep, but was dead. I was convinced, upon inquiry, that he had been attacked with English cholera, under which his exhausted powers sank.

Persons subject to chronic diarrhœa and subacute ("chronic") dysentery, and those who are said to have "irritable bowels," are especially liable to be attacked with cholera.

*The History of Cholera, in India and elsewhere*, has found a most able illustrator in my friend Dr. John Macpherson.\* Here it will be sufficient to mention that its first great epidemic outbreak, in modern times, commenced at Jessore, in Lower Bengal, in the year 1817, which, as I have already shown,† was a season of singular zymotic activity throughout the Peninsula of India. Thenceforward it has been constantly endemic in the Gangetic Delta, rarely, but distinctly, appearing as an epidemic in that locality, as in 1849. As I have shown in a previous work,‡ the Endemic Cholera of Calcutta is most severe in the Hot Season, which extends from about the middle of February until the commencement of the Rains (about June 20). But the statistical data which I have there cited show that the disease is very destructive throughout the year in Lower Bengal. I believe that Calcutta never has a day unmarked by a Cholera death. Now and then there is a rather severe outbreak at about the close of the Rains, and another very marked but less extensive one at Christmas time. In the North-Western Provinces, Cholera begins to prevail when it is on the decline in Bengal. In the former, the disease prevails most in June, July, August, and September,—July and August being the worst months. In the N.W. Provinces the disease can scarcely be said to be endemic. There a severe epidemic is to be looked for about once in three years.

It is well known that the late Dr. James Lumsdaine Bryden devoted many years of most careful observation to the investigation of the habits of Indian Cholera. In pursuing his inquiry, he had the singular advantage of being able to trace, in the office of the Sanitary Commissioner, every

\* "Annals of Cholera."

† *Medical Times and Gazette*, vol. ii. for 1832, p. 471.

‡ "Means of Preserving the Health of European Soldiers in India."

movement made by Cholera in India during the lengthened period of his quest; and there cannot be a doubt that one placed as he was, with the whole of the past history of the movements of epidemic Cholera tabulated before him, and in constant receipt of official intimation of every outbreak of the disease throughout the wide field of his supervision, would be able, as he was, to predicate with considerable accuracy the probability of the appearance of the disease, at a stated period, in any given locality, and thus to afford valid advice with regard to timing the movement of troops, the necessity for special sanitary precautions, etc.

Bryden's views, as far as he had endeavoured to lay them before the profession when his valued life was brought to a premature close, may be studied in the Annual Reports of the Sanitary Commissioner with the Government of India; in a Blue Book by Brigade-Surgeon J. Marston, 1878, Appendix No. 12, page 300; and in his own "Suggestions for the Systematic Study of the History and Relations of Cholera," in the *Indian Medical Gazette* for October 1, 1866.

Next to Fever, Cholera is the most destructive of all Indian diseases. Sir Joseph Fayrer shows that, in the year 1879, there were 270,552 deaths from this cause, out of 4,975,042 registered deaths from all causes.

I have said that in Lower Bengal the great endemic season is from the beginning of the hot weather in February until the setting-in of the Rains in the third week of June. There is generally stormy weather at about the end of the second week of March; this almost always sends in a batch of cholera cases, *palkee* (palanquin) bearers and other poor creatures whom the rough weather has chilled; then there are a few days of cool weather, in which there are very few cholera admissions; and then great heat sets in, and with it come a crowd of cholera patients. My cholera ward held twelve beds, and the cases usually came in so fast during the epidemic season that it occurred to me nearly every year that I should have to find extra accommodation; but the necessity for this always happened to be prevented by the rapidity with which patients died and left beds vacant.

When, during the very hottest weather, and when the prevalence of cholera is at its height, a storm cools the atmosphere, it, as I have already said, chills and endangers those who are most exposed; but such a change almost certainly abates, for a little time, the severity of the outbreak. Thus, I have before me a report in which it is stated that, not long since,\* the population of Manilla was being de-

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\* I have not the precise date.

cimated by cholera, when at the end of October (1882?) a tremendous hurricane swept over the island, almost entirely destroying the town. In less than an hour from the commencement of the storm not a single native house was left standing. But on the following day not a single case of cholera occurred, and not one had been reported since. Here we inquire—how long since? In Calcutta the *chota bursat* (little rains) occur at the height of the cholera season, at about the beginning of the last week in May. They influence the endemic in the manner which I have described; but, during the twenty days of intense heat which generally follow them, cholera is very prevalent. When the Rainy Season sets in steadily, about June 20, we almost invariably have reason to consider that “the Cholera Season” is over.

With regard to *Measures of Prevention*, I am in accord with the believers in the communicability of Cholera, in maintaining that, on the arrival of Cholera cases in ships, they ought to be treated apart. But I would do this not as a sanitary precaution, but as a means of testing the question—did these people bring Cholera into the country? I think it is certain that the segregation of those members of a household who may be attacked ought to be strongly recommended, but ought not to be made compulsory when the other members of the family are energetic and courageous, or when due assistance is obtainable. When such removal is voluntary, it is advisable, not as a means of preventing the spread of Cholera, but upon the consideration that a well-managed Cholera hospital is the best place; as, there, due attendance is available night and day. In a private house, the services of four persons—a day and a night nurse, duly instructed, and two strong men to apply friction—would be absolutely needful.\* Soiled clothing and bedding should be burnt, because they are hopelessly nasty; not because they are fomites of propagation. Cholera excreta should be promptly removed and buried—for the same reason. The very best drinking-water, procurable at any cost, should be filtered and boiled and drunk as weak tea, not because we have to fear the presence in it of a cholera germ, but because bad and dirty water is a powerful *exciting* cause of cholera. So are all purgative and aperient medicines, especially

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\* A European officer, attacked with Cholera, had, what is very unusual in India, three adult and active ladies constant in their attendance. I said, “If each of you will alone attend him for a given time, you will be most useful; but, if you all continue to surround his bed night and day, you will all break down in a few hours.” They positively would continue to attend in this manner, and all speedily failed. One of the chief uses of a cholera hospital is the service afforded to the sick by its competent body of resolute trained attendants.

salines. At most, two drachms of castor oil with the same quantity of compound tincture of rhubarb, in cinnamon-water—*taken in the morning*—will suffice. Fruits and jams containing fruit-seeds should be avoided. So also should potatoes, which are certainly hurtful, almost poisonous, in dysentery. The diet should be plain, but very good. Roast and boiled and broiled fresh beef, mutton, and chicken—nothing corned or salted or smoked; well-cooked cruciferous vegetables; stale white bread (home-made if possible) and really genuine fresh butter; cold tea or, in great moderation, weak spirit-and-water. All the generally accepted rules of good sanitation, Civic, Household, and Personal, should be observed with absolute strictness.

Every member of the community may be bold in the confidence that his chances of suffering from the disease are small; and are only, if he be courageous and prudent, those which he shares with everyone else; and that his danger is not, in the very least, increased by the occurrence of cases in his household, or by visitation or attendance upon the sick. To-day (August 17), as I write this, I see it announced in the papers that, yesterday, the Khedive inspected all the Alexandrian Hospitals—sure evidence that his advisers did not consider that this humane act was attended with danger.

#### *Treatment of Cholera.*

The states of the Liver and Kidneys in cholera are so full of interest and importance pathologically, and still more in a therapeutic point of view, that it is surprising that they have never yet been made the subjects of thorough clinical investigation. Algide cholera, being more remarkable than any disease with which we are acquainted for the almost entire absence of *χολή*, bile, from the evacuations during its worst stage, that of collapse, we should approach more clearly to descriptive precision if we called it Acholia, and to pathological accuracy if we termed it Asiatic Pernicious Fever, — thus wholly separating it in our ideas, as it is absolutely distinct in reality, from several disorders of the bowels with which it is still unhappily confused.\*

As a general rule, exceptions to which are rare, bile pigment is not positively detectable in the stools and vomited matter of the algide stage, during which it appears that the excretive functions of the liver are, in the large majority of

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\* The active mischievousness of this antiquated name is displayed in the fact that even so modern a writer as Dunglison says that it is derived from *χολή*, bile, and *ρεω*, to flow, because it arises principally from a superabundance of acrid bile. This, in true Asiatic Cholera, is, of course, precisely the reverse of the fact.

cases, arrested as absolutely as those of the kidneys are in all cases. Dr. Edward Goodeve found that "nitric acid occasionally gives red reaction in the" [rice-water] "liquid. This is probably due to a small quantity of bile mixed somehow with the evacuations, but it is not certain what it is." It is here to be remarked that any bile which may appear in vomited matter and alvine evacuations, whether during the collapse stage or early in the stage of reaction, must not be viewed as positive evidence that hepatic action is not absolutely arrested, as its source may be the gall-bladder. Tanner says that cholera stools contain only a trace of biliary matter. During the epidemic of 1868, Dr. Thudichum observed, in death during the stage of collapse, that the secretion of bile was completely arrested; and that, in extreme cases, a clear white fluid percolates through the hepatic ducts, free from bile, colouring matter, and albumen. It seems to be simply water, with a trace of alkali and a vestige of mucus. In some instances the fluid was coloured, but contained no bile-acids. Placing cases of acute bilious diarrhœa or hepatic flux entirely aside, cases do occasionally occur in which the vomited fluid and the dejections, during the algide stage, are distinctly coloured by bile. This happened in the case of an administrative medical officer who died in Fort William, Calcutta, about twenty-six years ago; and again, in 1874, among the constantly varying types of true cholera which occurred in Calcutta, there was one in which the fluids ejected during collapse were distinctly coloured by bile. In March, 1875, I had, in my ward, a European woman who was attacked with Asiatic cholera after having taken a well-known "antibilious" purgative on the night of February 27. She died on March 4, at about eleven o'clock a.m., never having rallied from the collapse stage, and never having passed urine. She continued, up to two o'clock on March 3, to vomit a bilious fluid, the quantity of bile voided being far too large to allow the suspicion that it came merely from the gall-bladder. Stools ceased on the afternoon of the 1st. They were from six to seven in the twenty-four hours, and were markedly coloured by bile. The severity of this case was much aggravated, and the evacuating treatment interfered with by a tendency to abort, the poor woman being in the second month of pregnancy. In 1874 there was a great and very unusual tendency to bilious vomiting in the reaction stage and at the beginning of convalescence from true cholera.

The ordinary and most favourable type of alvine evacuation, after reaction has become established, is a free and perfectly fluid fœculent and very bilious stool, of a warm brown colour, of which there should be some five or six

during the twenty-four hours. Not unfrequently the first evidence of improvement is the passing of what are locally known as "Calcutta mud" stools, from their close resemblance to the dirty greyish mud of the Hooghly.

The behaviour of the Kidneys in cholera is, of course, far more open to clinical observation than that of the liver is. As a general rule, there is a considerable excess of bile-pigment in the first urine passed in cholera, and even far on in convalescence traces of biliary matter are frequently present in this excretion.

It is almost needless to say that, exceedingly as the types of cholera vary from year to year, and even from week to week, there is, in every case, complete suppression of urine during the algide stage; and that, however distinct the subsequent reaction may be, *we are never satisfied that the danger of collapse is over until urine has been passed*; and that we can never feel confident that our patient's second great peril, *the danger of uræmia, is over until the free excretion of perfectly healthy urine is re-established.*

Dr. Begbie found that the first urine is of diminished density, and generally contains albumen and bilious colouring matter, with the ordinary salts, but little or no urea.

In his article on Cholera, in "Reynolds's System of Medicine," Dr. Goodeve wrote: "At first it" [the urine] "comes scantily, high-coloured, and an ounce or two, with a strong and peculiar animal smell, deficient in urea perhaps, but not in all animal principles, generally albuminous, with many transparent casts. The albumen or allied compound, when present, is not always detected by nitric acid, though often by heat, giving a deposit not dissolved by nitric acid when the nitric acid test alone failed to detect it. The urine often turns pinkish with nitric acid."

In the cholera season, extending from February to June, 1868, I, with the aid of my very able House-Physician, Baboo Raj Mohun Banerjee, commenced a series of observations upon the *specific gravity* of cholera urine, which, with an interruption of twenty months, I continued until I left India at the end of March, 1876. The general result of very numerous observations was that the first urine usually owes its high colour chiefly to the presence of bile-pigment. Blood has not been detected. The fluid is turbid. *The specific gravity is generally high, from 1020 to 1026.* The reaction is generally acid. There is commonly a sediment of epithelium desquamated from the renal tubes. Albumen is probably always present, most frequently in small quantity. Such urine may be passed (the catheter has to be used once or twice in many cases) twice or thrice, generally with a high, but reduced, specific gravity, as 1019. The case ad-



vancing in progress to another very distinct stage, the flow of urine is more free, the fluid is usually transparent and pale, and *the specific gravity is low—from 1012 even down to 1002*. Bile-pigment is generally present, and may frequently be detected up to the time of the patient's discharge; it usually out-stays the albumen. When the case does well the albumen usually disappears in from one to three days, but I have found it as late as the twelfth day. Renal epithelium has been noticed as late as the thirteenth day. During tardy convalescence phosphates often appear in the urine. *Whenever, in cholera, there are albumen and bile-pigment in urine of a very low specific gravity, what is now generally called uræmia, or, as it appears more correct to term it, cholo-uræmia, is to be apprehended and resisted.*

The following abstracts of cases, taken from many, fairly illustrate these principles:—

Charles S., admitted collapsed March 6, 1868, at noon. Reaction commenced in forty-six minutes.

First urine passed on the morning of the 7th—scanty, high-coloured, specific gravity 1024, traces of albumen.

8th.—Bowels free; no vomiting; urine free, specific gravity 1012; no head symptoms.

9th.—Vomited once; two stools; *urine copious*, specific gravity 1102, traces of albumen. Towards the evening evidences of cholo-uræmia appeared, he became delirious and restless, was constipated, and vomited several times.

10th.—Specific gravity of urine 1020, traces of albumen and phosphates, bile-pigment. The head symptoms passed off and vomiting ceased.

11th.—Doing well.

17th.—Discharged.

Charles M., admitted in a state of collapse July 19, 1868. Reaction took place on the following day.

The first urine was passed on the 21st; specific gravity 1021, scanty, turbid, acid.

22nd.—Urine profuse, limpid, specific gravity 1004, traces of albumen. There were now symptoms of cholo-uræmia—dulness, drowsiness, constipation, and vomiting. Gentle purgation, sinapisms, and fomentations over the loins.

23rd.—Bowels moved several times; vomiting ceased; urine free, specific gravity 1008, traces of albumen; no head symptoms.

24th.—Urine contained traces of albumen, specific gravity 1017. In other respects doing well.

25th.—Traces of albumen, specific gravity 1014.

26th.—Doing well. No albumen in the urine, specific gravity 1020.

29th.—Discharged, well.

Shiboo, admitted collapsed November 25. Reaction towards evening.

26th.—No urine; head symptoms, dulness, vomiting, constipation, laboured respiration, with thickly coated tongue and congested eyes; bowels constipated. Conjee-water injection; mustard poultice to loins.

27th.—No urine; uræmic symptoms; purgatives, dry cupping over the loins, fomentation.

28th.—Urine scanty, specific gravity 1026, slightly albuminous, and with bile-pigment.

30th.—Urine 1004, slightly albuminous; head symptoms, vomiting, constipation, gentle purgation.

December 1.—Urine free, specific gravity 1012, albuminous; bowels open; no head symptoms.

2nd.—Urine specific gravity 1016, traces of albumen  
Doing well.

3rd.—Urine 1016, no albumen. Doing well.

4th.—Urine free, 1018, no albumen.

5th.—Urine free, specific gravity 1022. Doing well.

9th.—Discharged, well.

The following case is singularly remarkable for the extremely low specific gravity of the urine, which continued far into convalescence. At first the urine was, as is usual, of high specific gravity; thenceforward, up to the time at which he was discharged, apparently quite well, on the forty-first day, its specific gravity did not rise higher than 1011. Moderate, but marked, symptoms of cholo-uræmia were observed—drowsiness on the eleventh day; restlessness (jactitation) on the third day; and insomnia on the fourth and sixteenth nights; and severe headache on the thirty-eighth day, when the urine had the (in this case) unusually high specific gravity of 1011.

The continued presence of albumen in the urine up to the twelfth day, of epithelium up to the thirteenth, and of bile up to the date of his discharge on the forty-first day, taken together with these symptoms, kept up constant apprehension of cholo-uræmia.

James W., admitted March 30, 1874, in a state of collapse. Reaction took place on the 31st, and urine was passed on this day, specific gravity 1022, without sediment, but with albumen and bile, bilious vomiting, and purging.

April 1.—Bladder relieved by catheter of twenty-nine

ounces of urine of acid reaction, albumen about one-sixth, and bile present, no sediment, specific gravity 1019.

During the next six days he made water freely; stools loose.

On April 8 (tenth day) the specific gravity was 1020, acid, with slight traces of albumen.

On the 9th (eleventh day of illness) there was a tendency to vomit; there were five brownish-yellow stools. The urine was 1010, slightly albuminous, and it is noted that he was somewhat drowsy.

On the 10th the urine was of the same specific gravity, with a slight trace of albumen.

11th.— Specific gravity 1012, no albumen.

13th.— Specific gravity 1006, reaction alkaline.

The urine continued to be alkaline until April 21 (twenty-third day), when it became slightly acid, with a specific gravity of 1011.

Thenceforward the reaction continued to be acid.

The stools were frequent and thin up to the fourteenth day. On the sixteenth day there were only two semi-solid stools and no vomiting, and the specific gravity of the urine was as low as 1004; insomnia was complained of. On the seventeenth day there was only one stool, no vomiting, the specific gravity of the urine was still 1004; the patient had slept well. On the eighteenth day there had been a stool in the night, and there was another late in the day; the specific gravity of the urine was only 1002. On the following day also there were two stools; no vomiting; he had slept well; the specific gravity of the urine was 1004. On the seventeen succeeding days on which the urine was examined, the range of specific gravity was 1010, 1009, 1010, 1006, 1010, 1007, 1005, 1006, 1008, 1010, 1011, 1010, 1009, 1010, 1010, 1011, 1008. During the whole of this latter period the rule was one stool in the twenty-four hours, and the appetite was generally good.

This case shows that, while a very low specific gravity of the urine after cholera is always to be viewed as an indication for extreme watchfulness of the patient's condition, and for caution in treatment and dieting, it is not by any means invariably, as regards prognosis, an extremely grave sign. Still it will be noticed that, on the tenth day of the illness, there was urine of the specific gravity of 1020, with slight traces of albumen; on the following day, the urine being still albuminous, the specific gravity suddenly fell to 1010, and drowsiness was observed; the bowels were, however, free. Again, when, on the sixteenth day, there were only two semi-solid stools without vomiting, the specific gravity of the urine being so low as 1004, there was insomnia.

When I first assumed my charge at the Medical College Hospital, in the cholera season of 1862, I found that my colleagues had an established system of treating the collapse stage of cholera. Their leading objects were :—

1st *To arrest Vomiting and Purging.*—The rice-water evacuations were regarded as being, potentially, hæmorrhage. This was to be checked by styptics, principally acetate of lead ; but opium and other narcotics were to be avoided as tending to produce uræmia, in the reaction stage, by locking up the excretions.

2ndly. *To obtain Reaction.*—Diffusible stimulants, especially aromatic spirit of ammonia, were given steadily every quarter to half an hour until reaction set in. The body and limbs were rubbed with dry ginger powder by relays of active ward coolies—one to each limb. Large sinapisms were applied to the præcordial region and abdomen.

I then adopted and generally adhered steadily (except when new plans of treatment, which appeared to deserve trial, failed in my hands) to my colleagues' therapeutic principles in treating the collapse stage ; but I made some changes in the *details* of their treatment. In choosing a styptic, I preferred tannic acid (ten grains after the first, and five grains after every subsequent rice-water evacuation, whether by stool or vomiting) to acetate of lead, which, if absorbed, was likely to act as a depressant. To ammonia I objected on account of its affinity to urea, and I always preferred chloric ether as a diffusible stimulant. I ordered dry ginger friction only to the *trunk* of the body, considering that rubbing the extremities could only tend to increase the already excessive congestion of the vessels of the great cavities. I therefore had eight hot-water bottles, frequently changed, in bags of thick flannel applied to the limbs and trunk in every case, and had recourse to strong shampooing (kneading) of the limbs only when cramp was present.

Sydenham gave *Opium* in cholera, and specially thanked Providence for the gift ; but Copland tells us that Frank and Schmidtman justly acknowledged the importance of Sydenham's observation that, when opium "is given too early, much disorder of the bowels and abdominal organs, with more or less fever, continues afterwards to be complained of, evidently owing to the arrest of a salutary effort, and the retention of morbid secretions." How, then, would these authorities have explained the undoubted good which opium effects in absolutely arresting the premonitory diarrhœa ? Macpherson gives opium in the premonitory diarrhœa, and considers that, in the invasion of cholera, opium (laudanum) "is still our chief remedy for a time." When collapse is

accompanied with a tendency to stupor, violent vomiting and purging having ceased, he takes it for granted that opium will have been given up. I certainly would not give opium where vomiting and purging were not exhausting the patient, and where stupor was threatened. Macnamara gives opium in the early stages, but not in collapse, even when frequent purging and vomiting continue. Drs. Aitken and Fergus maintain that opium is only to be given "if the evacuations are still bilious, the pulse fair, and the skin warm," and insist that "when vomiting, rice-water purging, and cramp set in, it is then too late for opium." In my hospital practice I scarcely ever saw a case of cholera which had not advanced at least to this latter stage; and it was then that, in respectful non-concurrence with authority, I gave opium. I long eschewed its use, except in premonitory diarrhœa; but, as my views regarding cholouræmia became clear, I gave laudanum a cautious trial in the collapse stage, and afterwards generally used it. I think that it aids the tannic acid in arresting the gastric and alvine evacuations, every one of which reduces the patient's vital powers distinctly a step lower. It aids the stimulant action of the chloric ether; and if it does, as I believe it does, assist our first therapeutic triumph, the establishment of reaction, we have no reason whatever to assume that it interferes with the restoration of the functions of the liver and kidneys. Even if it be assumed that it does so, there lies before us the necessity of bringing about reaction and we have at our command a clear line of treatment for the cholo-uræmia.

The patients were well watched, the laudanum was given cautiously, and was not continued after the rice-water evacuations had ceased. Thus used, I never saw it cause stupor or any other evil effect.

Although there may be no great power of absorbing drugs into the system during the algide stage, astringents, stimulants, and opium certainly do appear to act. It has been observed that, in most great outbreaks of pestilence, persons die suddenly, almost without symptoms. They fall, perhaps in the streets, struck down and overwhelmed by the concentrated intensity of the poison. I know of cases of cholera in which death occurred without vomiting, after one or two gelatinous stools. At the commencement of cholera outbreaks, when the natural tendency to death is at its maximum, we shall, I fear, always lose patients in the stage of collapse, but many patients are brought out of a state of pulseless collapse by the treatment described above.

We have shown that the first urine passed after an attack

of Asiatic cholera is generally acid and turbid from inflammatory products or organic *débris*, and contains albumen and bile-elements. Its specific gravity is high, apparently only in consequence of the presence of the above products.

As the urine becomes limpid, its solid matters as well as the albumen and bile-elements diminish, and the specific gravity is almost always low. When it is slow in losing its albumen, and remains of a specific gravity between 1002 and 1010, and there is a tendency to constipation, cholo-uræmic danger must be apprehended, and vigilantly and actively guarded and fought against.

That dangerous complication which, setting in rather late in the algide stage, or almost at any period before the excretive functions of the kidneys and liver have become re-established, destroys multitudes of cholera patients by blood-poisoning (constituting the second and last great peril of cholera, collapse being the first) is generally called *uræmia*. To be understood etiologically and to be treated with success, it must, however, be recognised and dealt with a *Cholo-Uræmia*, because in it we have, in the bile-pigmented albuminous urine of very low specific gravity, and also in the absence of the free bilious stools, which latter are essential to recovery from cholera, evidences that the terrible condition of blood-poisoning, with which we have to grapple, is due to failure equally of *Hepatic and Renal elimination*.

When the renal and hepatic tissues have been previously healthy, the uræmia and cholæmia of cholera are attributable, first, to congestion of the kidneys and liver, and, secondly, to lack of fluid in the system. Cholo-uræmia can be best guarded against by the use of large and repeated sinapisms over the liver and kidneys, by dry-cupping over the kidneys; the steady application of a pillow-case half-filled with hot dry bran, in which the patient lies; large hot linseed-meal or *soojee* cataplasms to follow the sinapisms over the liver and loins; and the free use of *nature's own diuretics*, water and milk. Dr. Goodeve says "water is the best diuretic." After cholera I have never dared to irritate the kidneys by more stimulating direct diuretics. These organs can, at this most critical period, only be *solicited* by the use of bland demulcent fluids, supplying the place of that which the cholera flux has almost completely drained the system of. Attempts to *compel* them to act can only tend to produce arterial congestion and uræmia. Still, even in the present day, there are some otherwise judicious practitioners who, becoming impatient at the slowness with which the congested serum-exuding, desquamating kidneys begin to act, while yet

unsupplied with that water without which urine cannot be made, are unable to refrain from goading these already sufficiently over-burthened organs into premature action. One thinks that "a few doses of benzoate of ammonia" will act as a gentle diuretic,—as if the kidneys were not already sufficiently troubled in a struggle to void urea! Another uses "solutions of the chlorate of potash and the like"; and a third is only satisfied when he has added fire to fire by administering the tincture of cantharides!

In his remarks upon the treatment of the diarrhoea which follows cholera, a modern writer tells us that—"In those cases that are connected with defective secretion of urea, turpentine, either by the mouth or applied externally, is very useful." We are not surprised to find that he adds—"Cases of this nature are very obstinate, often continuing for months, and generally requiring change of air to the seaside, or a long sea-voyage to complete the cure." This recalls the case of congestion of the posterior part of the liver, which I have cited in a previous chapter, in which we are told that, *although* the patient was bled three times to deliquium, recovery was tardy!

In treating cholera I have always, on chemical grounds, avoided the use of ammonia in any form; and have, in consideration for the state of the kidneys, interdicted the use of cantharides blisters, and have even refrained from the use of turpentine stupes.

Another ground for caution in treating the renal complication is the alleged fact that cholera is apt to lay the foundation of kidney (and may we not suggest of hepatic?) disease. Upon this point I can say little. In civil practice, we have very few opportunities of tracing our patients' after-history. Officers of the A.M.D. might frequently watch men recovered from cholera for long terms, noting their habits of life, and examining the urine from time to time. I have known people who had suffered from cholera who appeared to enjoy fair health for years. In one of my voyages, a P. and O. Co.'s steward came up to me and said that I had brought him through an attack of cholera. He added that he had Bright's disease, and he apparently had it. Assuredly he never had any diuretic stronger than milk from me.

When the kidneys first begin to act we have always to watch the condition of the bladder, and, when needful, to relieve it by catheter. Otherwise it is likely to be unable to act and to become greatly over-distended.

As regards the Liver, there has always been a tendency to use calomel in cholera. When I arrived in India in 1848 I

gave it as others did, in frequent large doses, ten grains to a scruple, to *compel* the liver to act. A few years later, Ayres's plan of giving calomel in frequent small doses, with the view of *soliciting* hepatic action, came into vogue. Subsequently I preferred, when the bilious stools were either absent or scanty, or scanty bilious vomiting took their place, to use free counter-irritation by sinapisms, followed by large hot poultices over the whole hepatic region, front and back, and to solicit hepatic action by frequent gentle aperient doses and enemata.

Dr. Aitken says that, in men of intemperate habits, we often see, during the stage of reaction, obstinate vomiting of thick, tenacious, green paint-looking matter, probably bile-pigment acted on by some acid in the stomach or alimentary canal. It is, he considers, a symptom of evil omen, and it often goes on uncontrolled until the patient dies exhausted, and this, although all other symptoms may promise a favourable issue. It may last for a week, resisting all remedies, and proving fatal when the urinary secretion has been restored and all cerebral symptoms have subsided. In England, where cirrhosis of the liver and Bright's disease are much more common than they are in India, this irrepressible vomiting, in men of intemperate habits, probably depends mainly upon the presence of those diseases; as we find in India that where, in strong-looking dysenteric patients, the stomach persistently resists the use of ipecacuanha, the liver is nearly always considerably diseased. My Indian experience gives me no such terror of obstinate *bilious* vomiting after cholera. Indeed, I am usually glad to see bilious vomiting, regarding it as a very useful flux, only a little in the wrong direction. Here, under the free employment of sinapisms to the hepatic region and pit of the stomach, the evidences of gastric irritation generally subside, and a few salt-and-water enemata effectually solicit the bile to take its natural downward course.

As it is of great importance that we should view this *bilious* vomiting in its true light, I will quote what Dr. Goodeve says of vomiting in the reaction stage:—"Irritability of the stomach may be caused by some degree of congestion of its mucous membrane approaching to subacute gastritis, owing to the frequent straining and vomiting, and to stimulants incautiously given. It is not necessarily accompanied by feverishness, but there is generally thirst and burning heat of œsophagus and at epigastrium. The patient cannot retain nourishment at first, the smallest amount being at once rejected. This condition often lasts several days, and requires great care and attention. I do not remember to



have seen it fatal. When existing as the only symptom, great debility attends it, and convalescence is often delayed many days by its continuance. Sometimes it passes into a dangerous state of gastro-enteritis."

This description applies to vomiting which has its origin in congestion and irritability of the stomach itself, and not to that vomiting which is caused by a copious regurgitant flow of bile. Still, it fully confirms what I have observed, that it is generally within our power to conduct the vomiting which occurs in the reaction stage of Indian cholera to a successful issue.

My own experience of the state of the bowels in cholo-uræmia is that their action is generally deficient; either there has been constipation, or the stools have been few or scanty.

One of our greatest difficulties in treating cholera arises from the fact that, in Bengal at least, the type of the disease changes, as I have already shown, from year to year, and even from week to week; nay, carefully observed, no two cases of cholera are precisely the same. Familiar as I was with the cholera of Calcutta, the disease which I treated during a great part of 1874 was of a type altogether new to me. It was, doubtless, owing to this variation in type that Dr. Goodeve wrote—"The bowels" [in cholera uræmia] "are sometimes relaxed, sometimes constipated; the evacuations yellow and fæulent; diarrhœa may carry off some urea, and should not be checked." He does not appear to have used purgatives in the cholo-uræmia of cholera.

As then, it is generally found that, when cholo-uræmia sets in, the bowels are more or less confined, the prompt use of castor oil in very moderate doses (two or three drachms), and warm enemata of common salt and *conjee* (rice) water relieve the head symptoms and produce five or six more or less bilious stools in the twenty-four hours. It cannot be too emphatically insisted on, that *prolonged constipation in the reaction stage is always a cause for anxiety*. Restoration of the excretion of bile is quite as important as the renewal of the excretion of urine. No fear whatever of relapse, or even of moderate gastric or intestinal irritation, need attend this evacuant treatment, unless we overdo it. In using moderate enemata we are to bear in mind that the lower bowel has had little or no concern in the recent cholera flux. Hence it may be gently stimulated into action, with a view to a reflex impression upon the liver, without the slightest danger.

Indeed, I believe that, in cases where such gentle evacuant measures fail, stronger purgation is indicated.

We have reason to believe that there is no hope of recovery from cholera in cases where there has previously existed grave organic disease of the kidneys and liver. It is probable that patients with confirmed *Morbus Brightii* never recover from cholera.

In insisting that an evacuant system is needful in the cholo-uræmia of cholera, I in no way subscribe to the principle of the evacuant system of Johnson, as I have recourse to it not with a view to driving out the specific poison of cholera, but for the purpose of disembarassing and assisting the system in its efforts to free itself from accumulated and retained urine and bile-elements.

The utmost harm is done in cholera by the use of astringents, narcotics, and stimulants *after reaction has set in*, and by irrational attempts to stop vomiting and purging in and after the reaction stage. It is not for us to check nature's own means of clearing the system.

The clinical experience of several cholera seasons gradually established and confirmed in my mind the conviction that we can only prevent the cholo-uræmia of cholera, and successfully treat it when we find it to be present, by a full recognition of the principles set forth above, and by watching the fluctuating conditions of the alvine and urinary excreta as narrowly as seamen watch the glass in threatening weather.

The vast importance of a course of treatment which will enable us to control the cholo-uræmia of cholera is shown by Dr. Goodeve's statistics of deaths during the reaction stages. In the great home epidemic of 1853-56, 14 per cent. of the deaths were from consecutive fever. In that of the North-West Provinces of India in 1861, 22 per cent. of the fatal cases died in the reaction stage. Dr. John Macpherson shows that, during a period of ten years, one-fifth of the fatal cases of cholera in the Calcutta General Hospital died after the stage of collapse was over.

It is always important to bear in mind that in Cholera, as in true enteric fever, the main incidence of the disease is invariably upon the lower part of the small intestine. Here, principally, the rice-water stools are formed; and, as I mentioned above, this part of the bowel was absolutely occluded in the fatal cases which I examined post-mortem in the Bengal epidemic of 1849. Consequently, we should always examine the right iliac fossa, and counter-irritate there most freely, especially if there be fulness and tenderness.

Although I regard Cholera as a Pernicious Fever, I have seen and heard nothing to show that Quinine has any power of commanding it. Should cholera arise amongst us, every

member of our community ought to take a tonic dose of quinine daily. Thus the lives of multitudes would probably be saved, the drug acting as a nervine tonic, promoting healthy digestion. But, as we have already seen that quinine is not *specifically* prophylactic in averting marsh fever, it cannot be relied upon alone as a certain means of preventing cholera (Macpherson).

We, of course, give quinine as a tonic in convalescence. In the outbreak of pernicious fever at Deesa in 1835, the symptoms of which have been detailed above (page 209), quinine was pretty freely used, but "often disappointed expectations." But, at that time, quinine was not relied upon as it deserved to be. In the fever at Bellary, in 1840, Mr. Parry, although a strong believer in calomel, places the following words in italics—"During the intermission it" [calomel] "was frequently combined with quinine, and in this combination it proved eminently serviceable." Speaking of the "Malwa Sweating Sickness," Dr. Murray wrote—"Quinine is the sheet-anchor in this disease, and there are few symptoms that would prevent my giving it." Hence the importance of judging, in any outbreak and in every case, whether we have to deal with Pernicious Fever or True Cholera. "Cholera," says Macpherson, "is not ushered in by rigors: the fluids ejected are yellow, green, or bilious in pernicious fever; in cholera like rice-water."

All my experience tended to show that few things avail more in the management of cholera than *sedulous care and good nursing*. I often told my students that, if I should be attacked, I should wish to be attended by one who imagined that he had discovered a cure for the disease—no matter what, unless it happened to be croton or castor oil, nitrate of silver, or tincture of lytta.\* The discoverer, when he is, as he usually is, a man of experience, science, and humanity, always surrounds his "cure" with so much wise precaution and sedulous care, and such attention to every turn of the malady, that his patients undoubtedly stand a better chance of recovery than do those who come under a routine system of everyday treatment. Whatever his plan of treatment may be, he will, assuredly, have the largest amount of success, even when the outbreak is at the deadliest acme of its destructiveness, who treats every case as a distinct therapeutic study. This law is enforced by the fact, which I have already strongly insisted upon, that no two types of cholera—nay, that no two cases of this disease are precisely

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\* All of which enjoyed brief reputation.

the same. Hence the necessity of not relying wholly upon any specific or routine mode of treatment, but of treating every case throughout in strict accordance with its own particular conditions. On the other hand, Indian physicians are so fully accustomed to the disappointment of losing nearly every case at the first outbreak of cholera, that this ill-success never shakes their confidence in what they have proved to be right principles of treatment. If we treat our cases steadily, upon a system proved by long experience to be rational, we shall probably find that, at the end of an outbreak, at least some 40 per cent. of our cases have recovered. If we change our plan indecisively every time we lose a case, we shall at length come to the decision that our treatment has failed throughout, and that we have left a vast amount of good undone in taking the responsibility which ought to have been held by a man of decision.

I know of no disease in which so much benefit may be obtained from *good nursing* as in Cholera. Sensible nurses may be readily trained, and need have no apprehension whatever that this duty will, in the very slightest degree, add to the danger which they share with every other member of the community. In giving ice, in seeing that the patient does not incur the peril of sudden death by syncope by having his head raised, in attending to the heat of the water-bottles and in applying the sinapisms, in keeping to their work the relays of assistants who apply the dry ginger frictions, in feeding, in encouraging the patient, and indeed in carrying into effect every means of relief and every needful precaution until convalescence is established, an active and experienced nurse is invaluable. It was my frequent remark in India, that my leading measure in the care of my cholera patients was the attendance of Mrs. Sheen, the practised nurse of my cholera ward.

I must repeat that, for a considerable time before I left India, I considered that I possessed certain definite indications which guided me in the treatment of Cholera.

I will not boast that, from the time at which I first entertained these views, and carried them unswervingly into practice, I achieved any marvellous success in the treatment of the cholo-uræmic stage of cholera. I lost a very few patients from cholo-uræmia. I, however, felt that my failures were almost invariably due either to the fact that the patients had faulty organs, or to the circumstance of their having been brought to hospital too late for relief. Whenever these views had fair play, they led to decided success. I ceased to regard this cholo-uræmia as a terrible and irresistible mystery. I felt that I could generally either

prevent or encounter it successfully in a patient of fairly sound constitution, whom I treated from the commencement of the attack.

*Nourishment in Cholera.*

It is unquestionable that many deaths from Cholera, whether they occur in the stage of collapse or in that of reaction and cholo-uræmia, are, potentially, in a large measure due to starvation. The disease, in its early evacuant violence and paralysis of absorbent action, drains the blood of its fluid, and deprives the solids of the body of all nutriment. If, in the stage of collapse, we give milk, soups, etc., by the mouth or rectum, they are, in my experience, immediately rejected; and, with each vomit and dejection thus excited, the patient's strength goes down—as if, instead of endeavouring to feed him, we bled him. As long as the kidneys and liver are absolutely unable to act, we can scarcely hope to do much towards nourishing and supporting the patient by ordinary "feeding." We, of course, begin cautiously to give nourishment (I preferred milk), in small quantities frequently, as soon as we find that it can be retained; but effectual means of nourishing in Cholera are still an unattained desideratum in therapeutics. At present our main consolation is that we have seen hundreds of patients "pull through" attacks of algide Cholera, in which it has been evident that we were unable to effect much in the way of nourishment until the liver and kidneys had begun to resume their functions. With a heroism which has never been wanting among Indian surgeons, Dr. David Boyes Smith, while acting for me, some ten years ago, as Senior Physician of the Medical College Hospital at Calcutta, gave his blood, I believe, to deliquium, which was transfused into the veins of a hospital patient in the collapse stage. I understood that this noble act injured the physician's health without materially benefiting the patient. I was told this by our students—never by Dr. Smith. It is not exactly blood that is wanting in the vascular system of the dying cholera patient, who retains his due quantity of fibrin and blood-discs. This is proved by the fact that, in Indian cholera, many recoveries take place after hours of algide collapse, and that, in these cases, discharges of hæmoglobin do not attend convalescence; hence we may consider that whatever injury the blood-discs may sustain during the collapse stage is reparable up to a very late period. In the present day, it does not occur in the experience of everyone to see the living blood of a collapsed cholera patient. Some years ago it was suggested that stimulants should be given during

collapse, and that then a vein should be opened. By this means, it was conjectured, the circulation would be freed and the heart's working power restored. I, acting carefully upon this suggestion, gave hot brandy-and-water, and opened a vein in the arm of a fine young English sailor in the collapse stage, his head being kept low. The blood was of very good colour—not "tarry"—but it was distinctly thick, trickling down the arm, and ceased to flow before two ounces had escaped. I wish that it could have been fully examined; but, in our concern for the patient, who sank rapidly, we failed to preserve it. It appeared clear that this blood only wanted serum. I believe that, in Cholera, the blood-discs live quite as long as the man does, and could receive and benefit by a supply of serum up to the moment of the article. What appears to be wanting here is a fluid capable of supplying, in every constituent, the place of that which has been drained away. But the composition of such a fluid and the means by which it may be introduced into the bloodvessels have still to be demonstrated. The practice of transfusing variously-composed saline fluids had been abandoned, as worse than useless, before I went to India. Milk transfusion has appeared to afford some very doubtful promise; but I think that everyone who studies Dr. Benjamin Ward Richardson's most suggestive commentary upon the whole of this question,\* and reads Dr. T. M. Lownd's practical observations on "Feeding Patients in Cholera Collapse,"† will consider that the renewal of the lost constituents of the blood and the administration of direct nourishment during the stage of collapse are points largely open to hopeful research. I believe that few could do more justice to such an inquiry than the advocate of peptonised food prepared by the pancreatic method ‡—Dr. William Roberts, of Manchester.

I must repeat that no system of treating Cholera can be either scientific or valid unless every step be taken with due regard to the conditions of the kidneys and liver.§

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\* *Medical Times and Gazette*, page 124 *et seq.* of vol. ii. for 1883: "On Feeding by the Veins, and on Intraperitoneal Injection in the Collapse of Cholera."

† *Lancet*, page 123, vol. ii. of 1883.

‡ "Transactions of the International Congress of 1881," vol. i., page 517.

§ Since I remarked upon the considerable immunity of patients in the Calcutta Medical College Hospital from cholera, I have called to mind the case of a patient who was attacked in my native male ward. He recovered.



