

Shapter (Hos.)

# SANITARY MEASURES

AND

## THEIR RESULTS;

BEING A SEQUEL TO

“THE HISTORY OF CHOLERA IN EXETER IN 1832,”

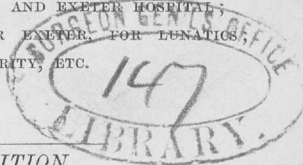
TO WHICH IS NOW ADDED

A SHORT ACCOUNT OF ITS OCCURRENCE IN 1849,

BY

THOMAS SHAPTER, M.D., F.R.C.P.,

SENIOR PHYSICIAN TO THE DEVON AND EXETER HOSPITAL,  
THE ST. THOMAS'S HOSPITAL, NEAR EXETER, FOR LUNATICS,  
THE LYING-IN CHARITY, ETC.



SECOND EDITION.

“A people, who can understand and act upon the counsels which God has given it, is safe in the most dangerous crisis of its fate.”—GUIZOT.

EXETER:  
WILLIAM CLIFFORD, HIGH STREET.  
1866.

EXETER:

PRINTED BY WILLIAM POLLARD, NORTH STREET.

TO

WILLIAM MILES, ESQUIRE,

(OF DIX' FIELD)

IN

TESTIMONY OF THAT JUDICIOUS BENEVOLENCE AND

UNOSTENTATIOUS LIBERALITY WHICH ARE

AMONGST HIS CHARACTERISTICS,

THESE PAGES,

BY ONE WHO, FOR A LONG PERIOD, HAS EXPERIENCED

THE VALUE OF HIS FRIENDSHIP,

ARE DEDICATED.

WILLIAM ALLEN TROTT

OF THE

THEORY OF THE INVERSE PROBLEM

IN THE THEORY OF ALGEBRA

BY

W. ALLEN TROTT

OF THE UNIVERSITY OF CALIFORNIA

BERKELEY, CALIF.

1914



## P R E F A C E.

The public benefit to be derived from the adoption of judicious sanitary measures is now widely appreciated; nevertheless, the placing, by way of illustration, in a clear and strong light a further striking instance may not be without its value, and, as such, the following pages have been put together. Should they assist, even in the slightest degree, the advancement of the good cause of sanitary improvement, they will fulfil the purpose for which they have been published.

In the former edition the official reports made by the Exeter Sanitary Committee were appended. As in great measure they were only repetitions of the text, they are now omitted, and in their place the short account of the cholera as it occurred in Exeter, in 1849, is inserted.

This account comprises the substance of the replies then made to the queries issued by the Royal College of Physicians of London, in anticipation of the report which was subsequently issued by that body in 1854. It is appended not only as being the test whereby the value of an attention to the sanitary condition of a population has been measured, but in pursuance of my wish to record those epidemics that have occurred, within my own observation, in the city in which my professional life has been passed.

Exeter has now, for the third time, become subject to the specific epidemic so characteristic of this century. Of the circumstances and phenomena which may now mark its recurrence, it is not my intention to be the public chronicler. It will, I hope, be done by other and abler hands, so that the lessons to be learned from it may not remain untaught.

The Barnfield, Exeter,  
29th September, 1866.



## CHAPTER I.

### SANITARY MEASURES AND THEIR RESULTS.

On the first occurrence of the Asiatic Cholera in ~~1832~~<sup>1844</sup>, Exeter, in common with London, Bristol, and Plymouth, experienced a large amount of mortality. On the recurrence of the pestilence in 1849, London and Bristol suffered more than, and Plymouth as severely as, on the former occasion; while Exeter escaped with only a very small amount of disease and death. This fact is in itself remarkable, but when it can be shown that, in this case, the comparative immunity enjoyed was, under Divine Providence, the result of human agency, and that, in those, the neglect of proper precautions retained to them their previous liabilities, it is indeed a fact of the greatest moment, and worthy of the most serious consideration.

The means which tended to procure for Exeter this satisfactory result, it will be the purpose of these few pages briefly to point out.

From the most cursory observation of the progress, in 1832, of the Asiatic Cholera in this City, it was obvious that its ravages had taken place in localities which were eminently unhealthy, namely those which were badly ventilated, undrained, and but very scantily supplied with wholesome water. The chief inhabitants immediately combined with the public

bodies in giving these questions a large consideration, and, through the years immediately ensuing, to such an extent were these evils abated and remedied, that, previously to the outbreak of the Cholera in 1849, I ventured to state (*History of the Cholera in Exeter*, Preface, p. xi.) there existed sure grounds for hoping that what had been done towards improving the public health generally, would be advantageously felt should Cholera reappear; that this disease would not only be much mitigated in intensity, but less diffused in extent; or even, if further and special precautions were adopted, might pass over the City without causing any very serious amount of mischief. This hope, in every one particular, was so signally realized as to render some review of the salient points of the subject worthy of attention. To do this satisfactorily it will be necessary to consider the state of Exeter in 1832, compare the mortality which then took place with that which ensued in 1849, and then detail the measures which had been adopted towards improving the health of the City generally; to this may be appended some mention of those other measures specially devised and carried into effect towards alleviating the pestilence itself. To detail all this will occupy no great space, while the lesson that it offers may not only be treasured by this City, but may prove useful elsewhere.

1832.  
Physical con-  
dition of  
Exeter.

In 1832, the period which first engages our attention, the City, as regards its social relations, may be said to have consisted of a dense population of rather more than twenty-eight thousand persons, occupying the older houses, which had been built within the walls and an airy suburb. The streets, for the most part, retained their ancient character, being generally narrow, and had leading from them numerous courts, lanes and alleys. The pavement, except in the great thoroughfares, consisted of rounded pebbles, locally known as "pitching," so arranged as to secure a fall from the sides of the roads towards their centre, and thus to form the gutter; this, in very nearly all the streets, was the only means whereby the sewage and nuisances of the City were removed. In some of

the principal thoroughfares and districts occupied by the more wealthy inhabitants, a few sewers had recently been constructed, but upon no general nor very perfect principle.

Beneficial as even this very small amount of sewage may have been, the supply of water then enjoyed by the City was so small, as materially to curtail its possible advantages. At this period, independently of the private wells, which were numerous, the public supply of water consisted solely of that afforded by the ancient conduit, a few public pumps, and the water-works. The conduit yielded a tolerably copious and constant supply to such as waited for their turn at the cock whence it was delivered. The water-works were very limited in their power, and the reservoir supplied by them was but a large cistern, so that the supply thus derived was totally inadequate to the requirements of the people. Much of the water used was laboriously obtained, by dipping it from the river and adjacent streams, and carried thence in buckets or in small water-carts, to the distant parts of the City, at the cost of one halfpenny per bucket.

This inadequate and difficult supply of water, combined with the deficiency of drainage, offers ample evidence that the accommodation for the daily usages of the population must have been very limited. The fact is, that though in the houses of the more opulent this want had been, to a certain extent, remedied, amongst the poorer population conveniences for these purposes were almost entirely wanting. Doubtless, much of the filth which prevailed in the lower parts of the City was thus inevitable, but much was also voluntary and immediately remediable ;—the extent to which it obtained, and the mischief produced thereby, could now scarcely be credited.

District Committees were accordingly formed to inquire into this state of things, and their reports detail histories beyond all belief. They speak of dwellings occupied by from five to fifteen families, huddled together in dirty rooms, with every offensive accompaniment ; of slaughter-houses with their putrid heaps of offal ; of pigs in large number ;—the note appended to the description of one house states, “ thirty-one

pigstyes, kept in such a state as would beggar description ;<sup>1</sup> and similar notes are frequent ;—of poultry kept in confined cellars and outhouses ; of dung-heaps everywhere ;—one cottage was visited in which the accumulated filth and soil of thirteen years were deposited, and esteemed so valuable a property that its removal was strenuously resisted. To add to this picture of filth and dirt, in many parts, the visits of the scavengers took place but once a week.

Mortality  
from Cholera  
in 1832.

Though the position and general characteristics of Exeter were those of health and pleasantness, such was the prevailing condition of its lower and neglected portions, when, on the 19th of July, 1832, the Cholera burst upon the City. Between this date and the 19th of October, in a population of 28,242, 402 deaths ensued from this disease, besides 142 attributed to other causes. This, doubtless, was a very large amount of mortality, especially when it is further considered that the former deaths were, as regards locality, very unequally distributed, amounting in four of the twenty parishes, which comprise the City, to three-and-a-half per cent. upon their population in the short period of three months. Now these four parishes, together with some few other isolated spots, were precisely those characterised by bad drainage and a generally ill-cared for and unwholesome state.

Mortality  
from Cholera  
in 1849.

We now turn to the second part of our inquiry, and we find, on the recurrence of the Cholera in 1849 (when it is to be recollected that London, Bristol, and Plymouth, suffered as in 1832), that in Exeter, with an increased population of 31,312, the total deaths from the 19th of July to the 29th of October, the period during which this epidemic prevailed, amounted, from Cholera and from diarrhoea, to forty-three only ; and even this number should not be stated without some abatement and modification, for of these, eleven died, not in Cholera, but from the consecutive fever ; while thirteen, being travellers and strangers to the City, came into it ill and died within a few hours. Assuming, however, that the whole number of forty-three were deaths proper to the population,



the very large proportion of twenty-six were amongst those located in the lower part of the City, and near the streams which there traverse it, or they resided in houses conspicuously dirty and ill-ventilated, and otherwise offering those conditions which usually predispose to malignant and fatal disease.

Having thus stated the mortality from Cholera in 1849 the altered conditions of the City at this period, from those of the more fatal period of 1832, may now be detailed.

Immediately on the subsidence of the Cholera in 1832, when as before observed, it had been rendered obvious that the disease was solely predominant, and fatal in those districts of the City whose sanitary state was eminently imperfect, a Water Company having been incorporated, active means were taken towards affording a liberal supply of water, and, by the Commissioners of Improvement, for establishing a perfect and comprehensive system of underground drainage, and otherwise for ensuring, by the removal of narrow courts and old houses, free currents of a pure and wholesome air. In the autumn of 1847 the attention of the Public Bodies of the City having been called to the fact of the Cholera making progress westward, their zeal was excited towards further improvement and a general sanitary supervision. Parochial Committees made a household visitation, with the effect of exposing, besides much that was generally objectionable, the existence of many very serious nuisances. These were not only sought to be remedied, but on the General Board of Health declaring that "the Act for the more speedy Removal of Nuisances and the Prevention of Contagious and Epidemic Diseases" was in force, the public was, by handbills, advised "that in case any dwelling-house or building be in a filthy or unwholesome condition; or that there be any ditch, drain, cesspool, or ash-pit, in a foul or offensive state; or that there be kept swine, or any accumulation of dung, manure, offal, filth, refuse, or other matter, so as to be a nuisance, or injurious to health," any two householders might forward a written notice thereof to the Commissioners of Improvement.

1832—1849.  
Sanitary im-  
provements.

1847.  
December,

1848.  
Sept. 28.

1848.  
October 18.  
Sanitary  
Committee  
appointed.

who would cause the premises, within twenty-four hours, to be examined ; and if, after examination, or from the certificate of two legally qualified medical practitioners, it appears that the nuisance exists, they would lay the information before two justices, who would make an order for its removal within two days. Shortly after this the Corporation of the Poor appointed five members from their body to be a Special Committee to carry into effect the objects of this Act. This Special Committee, in conjunction with deputations from the Town Council and Commissioners of Improvement, constituted a Sanitary Committee, which, from Exeter being included in the schedule of the second notification of the General Board of Health, became invested with full powers, *proprio motu*, to carry into effect the provisions of this Act of Parliament.

1848.  
November 3.  
Exeter in-  
cluded in  
schedule.

The measures which it thus devolved upon the Committee to take, consisted of those conducive to the general health of the City, and those precautionary against the Cholera. For these purposes the Committee sat weekly,—the medical officers reporting to it the prevailing illnesses, and particularly specifying when these appeared to originate in, or to be influenced by, any defect of sanitary arrangement. These defects the Surveyor of the Commissioners was then directed to inspect and to report upon, and, if necessary, proceedings towards their abatement were immediately taken. The Committee, moreover, used the powers vested in it to compel a general and effective communication, by private houses, with the public sewers, and an efficient supply of water, both public and private, seeking by these, as well as other means, to ensure a wholesome state of the interiors of dwellings.

I can bear my own testimony that all this was pursued with the strictest impartiality, and to an extent which may be somewhat appreciated when it is stated that in furtherance of these objects, upwards of one thousand notices were issued by the Committee. A very strict superintendence was, moreover, exercised over the markets, so as to prevent the selling of putrid meats and fish, and not without a cause, especially as regards this latter article of food.

Such were the means which, more or less, during seventeen years, had been devised towards benefiting and improving the general health of the City; and to such an extent had this been carried, that in 1849, previously to the recurrence of the Cholera, drainage had become comprehensive and efficient; water gushing at all points yielded its ample supply; narrow ways and confined courts had been pulled down, and, by the judicious removal of obstructing houses, whole streets had afforded to them a free ventilation; nuisances, generally, whether public or private, had been greatly suppressed, &c. The immediate and very evident consequence of all this was the marked diminution in the former amount of diffused sickness, more especially of fever, which previously had been the almost constant occupant of the lower parts of the City.

The terrible experiences of 1832 were also duly considered by the Sanitary Committee, and all reasonable and practicable provisions made towards obviating them, should they again recur. These provisions may be briefly summed up. The City was portioned into ten districts, to each of which were appointed a medical officer and dispenser of medicines; the distribution of medicines for the alleviation of the premonitory diarrhœa, free of all cost, was amply provided for; a list of nurses kept; dépôts for hot-air baths, blankets, &c., appointed; and directions drawn up to facilitate the prompt application of these various means. There were also provided suitable accommodation for those "destitute of home" in buildings attached to the workhouse; and, for the families of those that might die of the Cholera, two "houses of refuge;" a site of ground for the erection of a temporary hospital, with the necessary plans and specifications; as also a precautionary handbill (Vide Appendix, page 34)

It was in consideration of these various circumstances, viz., the improved physical condition of Exeter, and these precautionary measures, I ventured to offer the assurance, referred to at the commencement of these pages, that, should the Cholera recur, it might be expected to pass over this City, not only in a mitigated form, but to a less diffused extent. This anticipation, as has been seen, proved singularly

1849.  
Precautions  
taken against  
Cholera.

correct, for while this disease was raging in all its former fury in London, in Bristol, and in Plymouth, and while indications of its epidemic influences were not wanting in Exeter, its prevalence here was so narrowed, and its fatal tendencies so far mitigated that, with the exception of the distribution of the handbill, and of the medicines against the premonitory diarrhoea, and the calling into activity the services of the medical men of two of the districts, none of the above provisions were needed.

Numerical estimate of sanitary measures.

This may be all stated in another and more striking way. The total deaths from Cholera in Exeter in the two epidemics of 1832 and 1849, amounted to 445; of these 402, or 90 per cent. took place, with the concomitants of bad drainage and a deficient water supply; while with, in great measure, an absence of these conditions, the complementary number of 43, or 10 per cent., only occurred. Can any more convincing statement be offered of the beneficial influence of sanitary improvements?

Money estimate of sanitary measures.

Again, let us estimate the relative bearings of sanitary provisions by the money test—one which Englishmen, if they do not consider conclusive, certainly regard as not irrelevant. In 1832, with neglected sanitary arrangements, the money absolutely expended in Exeter during the prevalence and in consequence of the Cholera amounted to upwards of £5,000; while in 1849, under sanitary provisions, it amounted to only £333 18s. 6d.; and it should be borne in mind that this comprised the whole of the expenses of the Sanitary Committee during the period of fourteen months (*i. e.*, from 18 October, 1848, to 8 January, 1850), in which it pursued the measures it deemed necessary. But the whole is not then stated; there must be added to the per contra account of 1832 the expenses incidental to the overplus of 359 deaths (*i. e.*, the difference between the 402 which took place in 1832 and the 43 in 1849.) It is difficult to estimate to what these may amount, but looking at the widowhoods and orphanage necessarily attendant thereon, they cannot but

form a very large item to set against the improvidence of a neglect in sanitary measures.

Moreover, in considering the above statement, it must not be forgotten that the public expenditure is alone referred to. That caused to private individuals, could it be ascertained, would only tell the same tale.

Before concluding these pages, two circumstances of some general interest, that took place during the occurrence of the Cholera, may be briefly mentioned; one the coming to the Port of this City of a vessel, the other, the arrival at the barracks of a regiment of soldiers, both reported to be in an unhealthy state from Cholera.

The Sanitary Committee, having received information that the barque "Union" had left the Thames for this Port, and that the Captain had just died on board of Cholera, sought instructions from the Board of Health, which referred the Committee to those given in the case of the "American Eagle" (Official Circular, No. 5, p. 77), at the same time "authorising and requiring" the Committee to take the necessary steps. On the arrival of this vessel, the two senior medical officers of the Corporation of the Poor were accordingly directed to repair on board, carefully to inquire into her sanitary condition, and report thereon. It was ascertained that the Captain had died on board, of Cholera, sixteen days previously, but that since then the mate, three men, and one boy, who comprised the crew, had continued in perfect health. It was not deemed requisite to interfere with the arrangements of this barque, and she proceeded to the quay to unload, &c.

1849.  
August 18.  
Barque  
"Union"  
arrives in  
the Port of  
Exeter.

During the early part of August the Cholera prevailed in some intensity in Plymouth. Amongst others, the military stationed there suffered. On the 2nd it broke out in the 82nd Regiment, and in the course of a few days many of the men died. The Barracks in which this regiment was quartered being eminently unhealthy, it was, on the 9th, ordered to proceed by the railway, to Exeter.

1849.  
August 9.  
82 Regiment  
arrives at the  
Barracks.

As this proceeding created throughout the City some excitement and an expression of public fear, it was my appointed duty, as Chairman of the Sanitary Committee, to solicit the commanding officer to march his men to the Barracks, not through the City, but by a nearer and more secluded route. Being at the railway station for this purpose, during the few minutes previously to the arrival of the train, I entered into conversation with the officer, who had arrived on the previous evening to make the requisite arrangements for the arrival of the regiment at the Barracks. He informed me that nine men had died, and that when he left Plymouth the Major was seriously ill. Whilst sitting by his side, it was obvious that his limbs were occasionally jerked in spasm (a symptom locally designated as being "twicked"). Learning from him that he had been somewhat unwell during the previous twelve hours, he was strongly urged, on the arrival of the regiment, to immediately apply to the surgeon for advice. The regiment arrived. The first question asked was after the sick major; the reply, that he had died at midnight. Any others ill? A few men, and one taken ill in the train, and sent back. All care for and thought on these topics were soon absorbed in the report he had to make to his commanding officer. The men were quickly formed into line, and marched off to their quarters. Within two hours the late Mr. Webb and myself were summoned to the bed-side of this young officer, who had by this time passed into a state of the most abject collapse from Cholera. The scene then witnessed during the remainder of the day was such as cannot easily be forgotten. The kindest attention was bestowed upon this young man by his brother officers, all ministering to him, in every particular, with the most cheerful, generous, and off-hand assiduity; nevertheless the neighbouring mess-table was as merry, and its jokes as loud, as it was wont to be. During all this time, two soldiers stood, as on guard at the door of the sick chamber, obedient to every slightest command. This young officer eventually recovered.

To resume. Subsequently there were taken ill in the 82nd Regiment four men only; of these, one was the servant of the



sick officer, who had been watching for two days and nights at his chamber door: he also recovered. The history of the Cholera in this regiment, after its arrival in Exeter, may in fact be thus summed up: five men attacked, of whom two died.

It is worthy of remark, and of the most serious consideration, that there never existed the slightest grounds for suspecting that the arrival in this City of the barque, in which the captain had died, or of the regiment, in which so many cases and deaths had previously occurred, had been the means of propagating the disease in any one instance; while both as regards the former, and more particularly the latter, the most beneficial and satisfactory results were conspicuously evident. The change in their position was simply this: they had quitted districts where epidemic influences were rendered fatal by local circumstances, to reside in one, also under the former, but where the latter had been obviated by sanitary measures.

On the 8th of January, 1850, the Sanitary Committee, considering that all risk from the disease, to provide against which it had been appointed, had passed away, concluded its labours, having previously drawn up and presented to the Corporation of the Poor and other public bodies of the City, a Report, in which its proceedings, as above detailed, were somewhat more fully set forth.

1850.  
January 8.  
Sanitary  
Committee  
resign.

A lesson, doubtless, was to be learned by the recurrence of the epidemic in 1849; and a lesson will also now be taught by its recurrence in 1866. It will probably be found that the instances of the disease that have occurred have been chiefly amongst a people inhabiting too numerous old and ill-constructed houses, and these, perhaps, so crowded together as to interfere with efficient and wholesome ventilation, or residences carelessly or wilfully ill-conditioned as regards cleanliness, &c; or in those persons unfortunately borne down beneath the yoke of those special habits of improvidence, which experience shows, even under more favourable circum-

1849.  
1866.  
Lessons to be  
learned.

stances, greatly predispose to disease in general ; or from an ignorant, or, may be, wilful neglect of precautionary and counteracting means.

To work all this out to satisfactory and obvious demonstration must be the work of those who may be induced to record the occurrences of the present time, and to deduce from them the lessons legitimately to be learnt from them.

Cholera  
recurs.

In the meantime, the City rests calm under the conviction that the best measures, which human foresight can devise towards the amelioration of its difficulties, are being taken by those to whom the legislature has seen fit to confide these anxious and most responsible duties.

## CHAPTER II.

## HISTORY OF THE CHOLERA, IN EXETER, IN 1849.

In the epidemic of 1849, the first case that occurred was on the 19th July, in the person of a German musician, who entered the city ill of the disease. He had journeyed from Plymouth, where some of his companions had been ill and died. In the course of three days this man was convalescent. The next case happened on the 9th of August, in the person of an officer of the 82nd Regiment, who had come to Exeter on the previous day, also from Plymouth. The regiment itself arrived on the 9th, being ordered from Plymouth in consequence of several deaths having there occurred amongst the men. The next cases were on the 10th, in the west quarter of the City. There is no evidence to show that these latter cases had been in any contact with the above. They had, moreover, been affected with diarrhœa for some days, which was then somewhat prevailing throughout the city.

1849.  
Commence-  
ment of the  
disease.

From the 19th of July to the 29th of October, when the last case was reported, 92 cases occurred,\* and of these 42 died.

As in 1832, the immediately antecedent symptom of

Premonitory  
symptoms.

\* The account of the disease, here given, is abstracted from replies, furnished in 1849, to enquiries issued by the Royal College of Physicians. To these replies a table was appended, in which was set forth the ages, occupations, habits, character of the disease, and the treatment, together with the final result of each of these cases. It is not deemed requisite to reproduce this table here, but reference will be specially made to some of the more notable and illustrative cases.

an attack was usually a painless diarrhoea, the discharges being of a light colour and of a yeasty appearance, accompanied by an expression of anxiety and a collapse of feature, twitchings of the limbs, "rolling" in the bowels, slight cramps, sudden vomiting, &c. As the disease progressed, the discharges assumed the characteristic rice water appearance, and without fœcal smell. These were invariably passed without pain, and associated for the most part with vomiting of a fluid of the same kind, having also a greenish deposit, cramps in the limbs, ringing in the ears, small and hurried pulse, prostration of strength, weakness of voice, breath and tongue cold, a shrivelled and corrugated state of the skin, with a livid aspect of the face and hands, passing in some cases into a decided blue colour. Though such may have been the general characteristics of an attack, the several cases that occurred presented many differences in their symptoms, but in this respect so similar to what has been described as happening in 1832,\* that it would be redundant here to detail them. It may, however, be mentioned that many cases occurred in which the rapidity of the fatal collapse bore no relation to the amount of fluid discharged from the blood vessels,† whether through the intestinal mucous membrane, or through the skin, and that the consecutive fever, into which some fell, offered somewhat of the follow-

Collapse.

\* *The History of Cholera in Exeter*, 1832, p. 212.

† The following are examples in which collapse and death were accompanied by scarcely any amount of vomiting, purging, or sweating:—J. W., male, æt. 50, had left London on 20th of August, having a yeasty diarrhoea; he travelled for three days, on the 23rd arrived in Exeter, and immediately fell into collapse. The vomiting and purging was very scanty, in the whole scarcely amounting to two pints; he died in twenty-one hours. A. J., male, æt. 61, left London on the 8th September, on the 9th attended to his professional avocations, on the 10th, at 2 a.m., fell into collapse: the discharges were but scanty; by noon he was insensible, and at 5 p.m. died. J. B., male, æt. 40, strong and healthy, had, comparatively speaking, neither purging nor vomiting; he died twelve hours after collapse set in. J. D. W., male, æt. 58, vomited the food he had taken in a few hours before, was but slightly purged, gradually passed into collapse, and died forty-eight hours after the first and only vomiting. This case was characterised by an absence of all active symptoms, having neither cramps, vomiting, copious purging, nor sweating; he early became lethargic, and so continued till death.

ing pathological conditions—a flushed congested face, eyes sunken and suffused, with an expression of extreme languor, dusky hue of skin, hands somewhat dry and shrivelled, pulse small and quick, jactitation and a general restless irritability, sickness not unlike in its expression to that of a sea sickness, tongue dry and warm, as also the breath, constant thirst, urine brown and loaded, dejections, with a deposit like coffee-grounds, or black, bilious and foetid, pain of brow, an expression at times of unconsciousness which was rather apparent than real, a general dislike to be interfered with or to be moved, though sometimes the restlessness took the form of demanding frequent change.

Consecutive  
fever.

The question that prominently offers itself for solution, after considering the phenomena of the disease in all its varieties, is, whether the affection of the intestinal mucous membrane is the primary disease, or only, in common with others, one of its secondary effects. On the one hand, there is the almost always existing diarrhoea, while on the other, many persons who did not suffer from diarrhoea, experienced the crampy sensations and twitchings of the muscles, which were so often observed accompanying it; and moreover, these latter symptoms were almost universally relieved by the warm aromatics and stimulating sedatives which relieved the diarrhoea itself.

Nature of  
the disease.

Again, what is the precise cause of the specific or choleraic diarrhoea, and which, in its confirmed state, assumes the form of the rice water discharge unaccompanied by faecal odour. May it not be a mere exudation, analogous to, or even depending on, the same morbid origin as those discharges from the mucous membrane of the nose and fauces after having been inflamed and congested by cold, or of the œsophagus, which, under certain circumstances, throws off rapidly so large an amount of serous fluid. There is however, this difference as regards consequences and the final effect—that in these latter cases the amount of membrane affected is not large, nor, from its position, indicative of a deep-seated vital action; while in Cholera,

this indication is strongly marked by the many accompanying circumstances ; moreover, the volume of membrane affected is greatly more extensive and immediately connected with the organs and functions of organic life.

An other and very important question also presents itself. Is the consecutive fever a necessary part, or an accident of the disease ? I believe only the latter, and for this simple reason, that often the worst cases of collapse are recovered from rapidly and without any such fever, while we know that collapse from other causes, as long exposure to severe cold, is often succeeded by a form of fever precisely similar in all its main features.

Proximate  
origin of  
Cholera.

As regards the proximate origin of the Asiatic Cholera, a very careful consideration of the phenomena which were exhibited by the various cases that occurred in 1849 confirms me in the opinion I ventured to express when recording the history of the disease in 1832. The prominent, it may be said, the whole, series of the phenomena developed, speak to that condition which is commonly understood by the term "collapse," and, without the phenomena peculiar to this state, death never supervenes ; nay, more, nor excepting in this state ; the natural course of the disease being either death during collapse, or a rapid recovery consequent on an emergence from it. Truly, some few, after rallying from the collapse, passed into a congestive fever, and, perhaps, died ; but these, it may be fairly assumed, as said above, succumbed to a cause which was accidental and superadded, and neither proper nor belonging to the disease. The question then arises, what is the cause of the collapse ? it is not due to exhausting discharges of blood or of diarrhoeal matters ; of the former there were none, while, in very many cases, the latter were not copious, and in some few entirely wanting, and these cases were usually the most rapid and fatal ; it appearing, in fact, that death ensued before they had become established : on the other hand, the larger proportion of those cases which terminated favourably were accompanied with the most frequent and copious discharges.



So far, then, from the collapse depending on, or being caused by, these discharges, it would rather appear that they are, to a certain extent, the means whereby a "materies morbi" is exuded, and are therefore to be esteemed as beneficial and conducive to reaction. As the collapse, which is the chief character of this disease, is not therefore the effect of exhaustion consequent upon too free and excessive discharges, it becomes necessary to inquire on what other cause it may be dependent. The slow and almost imperceptible circulation, the laborious breathing, the absence of secretion, &c., all indicate that the great organs of organic life are peculiarly affected, and that the due performance of their functions is interfered with, or even entirely suspended; that there is, in fact, the presence of that state of atony which is one of the causes of congestion. It must, then, be ascertained whence this state arises. For the solution of this question we naturally look to the nervous or the circulating systems: as regards the circulating system, there can be no doubt that the heart's action is early implicated, but it is by no mean so at first, nor indeed, prominently so, until other large organs of the body generally are affected, and an universal prostration of strength, and cramps, indicate that the rest of the muscular system is involved; nor can all the symptoms accompanying the characteristic collapse be referable to disorder here: collapse from the heart would not cause the peculiar discharges nor the cramps; hence its origin cannot be referred to primary errors in the circulating system. To the nervous system, then, are we driven to look for the proximate cause of the disease, and a careful examination of the symptoms shows every reason for concluding this to be its seat; the uneasiness in the heart, the oppressed breathing, the pains about the præcordia, the sinkings at the stomach, the hoarse whisper, the general depression and prostration of strength, the suppressed functions of the secreting organs and chylopoietic viscera, the discharges which are exudations rather than secretions, &c., all indicate disorder here.

It being granted that the primary origin of the disease is in the nervous system, it remains to inquire what portion of this

system is its seat. Occasionally some of the earlier symptoms indicate disorder of the brain, as intense headache, tinnitus aurium, &c., yet these are not of constant occurrence, and even then appear to be rather of secondary than primary origin; nor are their course such as is usually witnessed where the brain is itself affected, for, as the disease progresses, they do not proceed from bad to worse; on the contrary, distress here often ceases either naturally or by remedial means, without any alleviation, may be even on an aggravation, of the disease itself. The cramps, too, as opposed to convulsions, which are so singular an accompaniment of the attack, are less indicative of brain than of spinal or ganglionic disorder. Though the attendant symptoms may afford some ground for the assumption that the collapse is due to disorder in the spinal cord, yet such a conclusion is negatived by the fact that the collapse of Cholera is, on the one hand, unaccompanied by many of the usual symptoms of disorder in this system, and, on the other, is invariably characterised by many of those which are neither proper nor common to it. To disorder in the sympathetic system of nerves all may, however, fairly be referred. In fact, the whole series of symptoms, reviewed calmly and comprehensively, lead to the conclusion that here is the primary seat of the disease, and that hence proceeds all difficulty. The sympathetic nerves are freely and chiefly distributed to those principal organs of organic life, the functions of which we have seen so greatly disturbed, such as the heart, the lungs, the stomach and intestines, the liver, the kidneys, &c., and they are to these the main, if not the only, channel of nervous influence and action; secretion and nutrition being governed and controlled by their means: moreover, branches of this system, together with nerves of motion, accompany the blood-vessels throughout the whole body, and hence we see the connexion, with this disorder, of the cramps during life and the spasmodic twitchings after death. Further confirmation of this view may be found in the occasional occurrence of collapse in injuries of those organs to which this system of nerves is freely distributed, but more especially in the observed consequences of direct injury to the nerves them-

selves ; a blow over the cæliac plexus being capable of producing many of the effects above described, i.e. "of suspending the respiratory and other movements which minister to the organic functions, and hence not only a gradual stagnation of the latter, but a sudden and complete cessation of their whole train of action." Those lesser symptoms and pains which indicate disorder of the brain and spinal system, and which are occasionally met with in Cholera, may easily be accounted for in the morbid impressions conveyed to these organs, through the medium of reflex action, by those nerves which they themselves supply to the sympathetic system.

From the above we are, therefore, disposed to consider that the Asiatic or Pestilential Cholera consists essentially of a congestive collapse consequent on disordered action in the great sympathetic system of nerves. The exact character of this disordered action is difficult to define. We may, however, assume, on the one hand, that it is rather of a general than of a specific nature, from its course not necessarily being certain or defined, but capable of being cut short from the first ingress of nervous feelings and slight colliquative bowel disorder to the commencement of, or during, the collapse ; while, on the other, that it is of a depressing and stunning nature, both from its general characters, and from the class of remedies which, when properly applied on its first indications, may be said, almost invariably, to prevent the progress of the disorder.

The remote origin of the disease has ever been a vexed question. The facts that occurred in 1849 bearing on the subject may not be numerous, but some of them are not unworthy of notice. Remote  
origin.

With the exception of the first case that happened on the 19th of July, the cases occurred tolerably closely together, following each other in a scanty succession from the 10th of August to the 29th of October. It should be observed, however, that they occurred in the different localities, as it were in groups : that is to say, a few cases showed themselves, now in one district and then in another. Never-

theless, when cases occurred in the same house there appeared no law as to their simultaneous or successive origin.

There was no apparent connection between the first cases that occurred and those next affected; indeed, a careful investigation rather shewed the contrary; moreover, in the eastern and higher parts of the city where a few deaths only occurred, and these chiefly in the persons of strangers coming from infected districts and obviously under the influence of the disease, yet in no one instance did it spread amongst the people they came amongst.

The facts connected with the removal of the five companies of the 82nd Regiment from Plymouth to this city, and previously alluded to, are, whilst on this subject, worthy of more special reference. The Cholera, which was already prevailing in Plymouth, having broken out in this regiment, and the major and nine men having died, it was on the 9th of August marched into Exeter—the men being distributed some in the Higher and some in the Lower Barracks. On this same day an officer who had arrived the previous night was taken ill, but recovered; the same night a child died in the Lower Barracks. On the 13th, 14th, and 15th of August four cases occurred amongst the men in the Higher Barracks, two of which died. Beyond these there were no further cases, nor could any instances of the disease breaking out elsewhere be traced to their arrival in this city. The whole circumstances attending the removal of this regiment from Plymouth into Exeter speaks most conclusively in favour of the general policy of removing healthy persons from an infected into a healthy district. The policy of removing people when already under the influence of the disease is another matter.

To resume. Several instances occurred in which persons showing unmistakeable evidence of being affected by the disease in its earlier forms, left the city and succumbed to its more confirmed symptoms in the neighbouring towns, but there were no examples of the disease having been, through the agency of these cases, originated in these several

localities. On the other hand it frequently happened that the persons nursing cholera patients became subject to the disease, and there were also three instances of persons, who had washed the bed linen of patients, being afterwards attacked. The most notable is the following: A female, æt. 47, of weakly habit and of a timid disposition, came into Exeter from a village eight miles distant to attend her mother, who died of cholera ten hours after her arrival. She remained in the house during the remainder of the night, and then returned to her country home. Shortly afterwards, after washing her mother's clothes, she was attacked with purging, vomiting and cramps, fell into collapse and died.

I shall not here pause to discuss the bearing of the above <sup>Propagation.</sup> on the much disputed causes of the propagation of the disease; whether they bear out the fears and strong assertions of the Orders in Council issued in 1831; or that scepticism whose dogmatic opinions find expression in those of 1849; or the more general and modified views of those of 1866; but shall content myself with repeating that, after a full consideration of the controversy, my conviction continues to be "that the Asiatic Cholera is essentially an epidemic, originating in, and chiefly due to, aerial influences, but capable, under peculiar and rare conditions, of being transmitted from man to man."

We will now briefly consider some few examples of the <sup>Predisposing causes</sup> more obvious causes that apparently predisposed to the disease. Excepting the two strangers above referred to, the earlier cases occurred in low situations, with accompanying conditions that rendered them generally insalubrious. In truth, by far the larger proportion of persons attacked were those living in the low parts of the city, their houses being dirty and ill ventilated, and presenting such general conditions which, as experience fully shows, under other circumstances, usually predispose to malignant and fatal disease.

Drinking  
Water.

Though there was no evidence of the drinking water being infected, inasmuch as the river, which flows through Exeter, proceeds from places which had not experienced the disease, yet, unlike the epidemic of 1832, the baneful influence of living near the water was, in 1849, remarkable, for out of the 92 cases that occurred between the 19th of July and the 29th of October, in the whole of Exeter, 55 lived immediately contiguous to the Mill Stream which flows through the lower part of the city; and of these latter 26 died, while, of the remaining 47 cases, and which occurred beyond its influence, only 17 died. As one of the large sewers of the city empties itself into this stream, the above undue mortality was deemed worthy of special investigation, and the subject was accordingly referred, by the Local Sanitary Committee, for consideration, to a committee of the chief Medical men of the city. These gentlemen, after well weighing all the attendant circumstances, came to the conclusion that this larger proportion of sickness and death was not due to the admixture of sewage matter; and for the following reasons: from the rapidity of the stream the amount of sewage matter is proportionately small, and therefore, from dilution, innocuous; from the disease neither primarily, nor even subsequently, showing itself particularly in the immediate locality of the opening of the sewer, but, having commenced low down the stream, and, as it were, spread upwards; and from its water being never used by people living in the neighbourhood for any culinary purpose. The medical men attributed the greater proportion of disease to the accompanying fogs and dampness, rather than to any other mode of operation.

Foul Air.

Of the injurious and direct influence of foul smells\* and the

\* Of the influence of the foul air of a drain immediately inducing an attack, a notable instance occurred: R. G., male, æt. 14, of sober and active habits, and previously in good health, was seized with vomiting while at work upon a drain, in two hours he was in collapse, and in 14 died. In another case J. T., æt. 31, male, a pattern maker, fell into collapse, but recovered. He attributed his attack to the workshop being over the mouth of a sewer. Many of his fellow-workmen were ill at the same time of diarrhoea.



effluvia from drains many instances are noted, and with so obvious a particularity as to show that they must be ranked amongst the most prominent of the predisposing causes.

Of personal habits, it would appear that travelling or the changing from one infected district to another when under the influence of the disease, predisposed to its early and full development, for it was remarkable the great proportion of strangers that were attacked and died immediately after their arrival in the city. Of the 43 that died 13 were strangers and came direct, in all cases, from infected places. Previous ill health, drunkenness, and dirty habits, also induced states of the body favourable to the development of the disease. On looking over the list of cases there were only a few instances of strong, healthy, well-conditioned people being affected.

Personal habits.

The following account of the medical treatment of Cholera pursued in Exeter in 1849 is deduced from observations recorded in the official daily returns. The various methods adopted may be classified under the several heads of—Mercury in small and frequent doses, and in large doses ; mercury with opium ; opium in large doses ; stimulants, as ammonia, camphor, &c. ; acetate of lead ; cold water and ice ; bleeding ; external applications, as sinapisms, turpentine, &c., &c.

Medical Treatment.

The treatment by mercury and opium, whether separately or combined, was, for the most part, generally adopted ; therefore, before making any observations upon the apparent effect exercised in individual cases by these agents, the following numerical statement of the cases in which they were used, with the result, is appended. Under the head of consecutive fever are comprised those who experienced febrile congestion, though it may have been for only two or three days.

Numerical Statement.

	Number Treated	The actual Number						The preceding stated in proportion to 100					
		RECOVERED			DIED			RECOVERED			DIED		
		Promptly	After Fever	Total	Promptly	After Fever	Total	Promptly	After Fever	Total	Promptly	After Fever	Total
Mercury in large doses ..	1	..	..	..	1	..	..	..	..	..	..	..	..
Mercury in small doses ..	11	4	2	6	1	4	5	36	18	55	9	36	44
Mercury with Opium ..	68	3	18	41	21	6	27	34	26	60	31	9	40
Treatment without Mercury	24	8	0	8	12	4	16	34	0	34	50	16	66
Opium in large doses ..	1	1	..	..	..	..	..	..	..	..	..	..	..

From the above it would appear that mercury in small and repeated doses—and it was chiefly used in the form of calomel—was accompanied by a mortality rather greater than when given in conjunction with opium, but by much less mortality than a treatment in which no mercury was administered. The deaths, also, which occurred were not so rapid as they were in both of the latter modes of treatment; a much larger proportion of cases dwindling on into consecutive diseases and then dying: at the same time, those that did recover were less affected by this consecutive fever than when opium was used, but very much more so than where a treatment without any mercury was resorted to.

The treatment by mercury and opium has a slightly less proportionate mortality than where no opium is used, and a very considerably less amount than where no mercury has been used. The deaths that occurred under this treatment, however, were prompt, few only passing into consecutive fever. The recoveries show no great dissimilarities in their proportion from those where calomel, but no opium, has been used.

A treatment conducted without mercury shews a much higher proportion of mortality than where it is used, whether with or without opium, the deaths chiefly taking place in collapse: the recoveries, however, which did take place were for the most part prompt, and therefore unaccompanied by consecutive fever; but there was this remarkable feature, that

whilst the proportion of immediate deaths was not only greater in a treatment without mercury, those that fell into the consecutive fever also died.

Looking at the numerical statement only, it would appear that mercury, though controlling the collapse, does not prevent the occurrence of the consecutive fever; and that the opium, while aiding in the former, conduces also towards averting the latter.

We shall now proceed to speak of the observed effects of <sup>Mercury.</sup> mercury and opium, combined and uncombined. Mercury uncombined with opium, as just observed, appears to control the collapse. Is this property due to its immediate purgative qualities, or to its specific action on the liver, or to the power it exerts in quelling that congestive and inflammatory form of stomach and intestinal irritation which is so often accompanied by vomiting. As a purgative, it obviously has but little influence, for the cases in which it was administered shew that it neither induced nor increased the frequency or amount of the serous discharges.\* It appears rather to act by allaying irritation and promoting an earlier secretion of bile, especially when given in small and repeated doses. Of the fifteen cases in which mercury was thus given, it also appeared to act by relieving congestion, as indicated by a recurrence of pulse and warmth, and by an earlier appearance of green motions; nevertheless, under its sole influence the recovery from collapse was not for the most part prompt and complete, the functions of the liver and kidneys continuing for some time considerably impeded.

The combination of opium with mercury, while it in no way <sup>Mercury and Opium.</sup> prevents the reactive and excitant powers of mercury alone, appears not only to increase and add to these qualifications,

\* Many cases might be quoted in which large amounts of calomel were administered without any special purgative effect. The following is an illustrative one:—A.B., male, æt. 45, in collapse four hours, pulseless, sunken face, blue extremities, cold moist skin, scanty vomiting and purging of rice water, and no urine passing;—calomel in large doses was administered without any visible effect. In six hours, i.e. after ten hours collapse, he died.

but at the same time to exert a specific control over the cramps. The combination of mercury and opium tends on the first ingress of the disease, i.e. when there are serous discharges, with a small pulse, but before what may be termed a decided state of collapse is established, to arrest the discharges, warm the bowels, check cramps, and to free the internal organs from the atony that is impending, as shewn by a recurrence of pulse, and general warmth, and the discharge of organic secretions in conjunction with the serous discharges. After collapse is fully established the combination appears to avert death more successfully than mercury by itself; nevertheless, if its employment be too long persevered in, the collapse, though recovered from, is likely to pass into consecutive fever.\*

Opium  
without  
Mercury.

Opium without mercury, in the early stages, and before collapse was fully established, had a notable effect in preventing the development of the disease, immediately allaying the internal depression, crampy feeling of legs, and checking the alvine discharges. It would also appear to have the power

\* Of the direct and immediately useful effect of large doses of calomel and opium the following cases are illustrative:--F. K., female, æt. 30, in collapse one hour and a-half; pulse almost imperceptible, quick, face sunk, tongue cold, extremities and surface cold, feet and hands reddish blue, vomiting and purging of rice water discharges, frequent and excessive cramps, no urine. Five grains of calomel, with half a grain of opium, was administered every half hour for three hours: the pulse became more perceptible, and the cramps less; this treatment was followed up by smaller doses, and the use of the hot air bath and frictions. The result was a speedy amelioration of her symptoms, and an entire recovery from collapse in eleven hours, i.e. twelve hours and a half from the commencement: there was no consecutive fever.

H. S., male, æt. 70, collapse two hours; no pulse, surface cold, extremities blue, frequent vomiting and purging of rice water, cramps violent. Twenty grains of calomel was immediately given, followed up by smaller doses; he also drank cold water freely. After some hours, the alvine discharges became greenish, and he slowly rallied from collapse; he passed into a feverish state, of nine days duration, and then recovered.

J. C., female, æt. 25, in whom collapse was in all respects complete; purging appeared to be arrested by the use of calomel and opium, with ammonia. She rallied from collapse, and recovered after a week of congestive fever.

J. P., female, æt. 50, being in a complete state of collapse for three hours, took large and continued doses of calomel and opium. Recovered in the course of twelve hours, and without any consecutive fever.

of arresting the disease after collapse is partially established.\* Nevertheless, after collapse was fully established, its power of controlling the rice-water evacuations and vomitings did not appear very considerable; and though it certainly exercised a beneficial effect in allaying cramps of the extremities and bowels, if the heart or chest were their seat, it acted injuriously by increasing the oppression of these organs.

In those cases which were marked by an active restlessness, with a bright eye and anxious countenance, the power of opium in producing sleep rapidly, or even eventually, bore but little relation to the quantity taken as indicated by its effects under ordinary circumstances; but if the disease assumed a comatose form, this state was immediately and obviously increased by its use.

The following is a brief summary of the use of mercury <sup>Summary.</sup> and opium as deduced from the preceding observations.

Mercury proved a valuable medicine, and useful in probably all cases of impending or confirmed collapse by counteracting the tendency to suppressed functional power in the organs specially affected in this disease; that its use is more particularly called for in those cases where, collapse being confirmed, the purgings and vomitings are neither frequent nor copious; that it does not directly increase the amount or frequency of rice-water purging, but qualifies their character by inducing, whether directly or indirectly, functional action in the organs of organic life; that, by itself and uncombined, its power of restoring the functions of these organs is not fully developed, nor fully equal to controlling collapse and obviating subsequent congestion; that as its usefulness appears to be indicated by the effect it produces upon organic function, and as its power of doing this is not always by itself sufficiently prompt, other remedies to this end appear useful in combination with it.

It is worthy of remark, as proving the efficacy of mercury

\* The following case is illustrative of the effect of opium in the earlier stage of the disease: S. D., female, *æt.* 35, collapse three hours, small, almost imperceptible pulse, cold and blue extremities, frequent rice water vomiting and purging, partial suppression of urine. Took opium freely, in combination with acetate of lead, and with immediate relief. Recovery, though gradual, was established without fever.

in Cholera, that, being an active and powerful medicine, more recover that use it than otherwise, or than under any other mode of treatment. A strong argument is thus established in its favour ; for if it were not beneficial we may assume it would be injurious, and this it certainly is not.

When mercury is administered, it, as well as all other remedies, should be given immediately *after* an attack of vomiting ; it is then rarely rejected. Patients will frequently refer their sickness to the remedies used, while it is really more often due to the stomach being distended with the serous exudation. If the medicines are therefore taken after a vomiting, and when the stomach is empty, it is remarkable how little the sickness, from intolerance of medicines, is complained of, and in this Cholera varies much from a mere bilious sickness.

Opium appears to have a direct influence both in averting and rallying from collapse. Before collapse is established, and in its earlier stages, it quells sickness and allays the cramps ; promptly given in the early period of complete collapse, it also appears most beneficial, then also allaying cramps in the extremities and bowels, and apparently relieving the organs which are oppressed. It is, however, not universally applicable, nor in all cases to be incautiously used ; it should not be given if torpor or any congestion of the head have come on, nor if there be a hurried breathing or cramps about the heart, nor after bile is mixed with the discharges, as indicated by their having a greenish tinge. The utility of opium appears to be chiefly in those cases which, being free from drowsiness, are largely accompanied by cramps causing active expressions of pain, and then only in the early stage. Two or three effective doses of opium, on the first ingress of collapse, may be of the greatest benefit ; repeated in the later stages, it appears to increase the congestive character of the disease, and certainly contributes much towards counteracting organic secretions and that perfect and unembarrassed reaction without which congestion becomes established and fever is the result. In the consecutive fever, opium is obviously and immediately injurious, unless nausea and vomiting persistently continue, then a dose or two are useful. When the use of



opium is not contra-indicated, the effect of mercury is much assisted and perfected by a combination with it; together they form, in the greater proportion of cases, by far the more successful mode of treatment. The combination is certainly most useful in cutting short the incipient collapse, has obviously much power to relieve an established collapse, and, judiciously employed, prevents, more effectually than any other treatment, subsequent congestion with its accompanying fever.

Stimulants, as ammonia, alcohol, &c., &c., are useful in the Stimulants. premonitory disease and earlier stages of collapse, but their use is more doubtful after collapse is fully established. These remedies were notably employed in forty cases; of these twenty-one died, and nineteen recovered; and, as many of these recoveries were not from the severer forms of the disease, the adoption of stimulants generally cannot be considered advantageous. After collapse was established few only were anxious for them, while by far the larger proportion expressed a repugnance to their use. They appeared chiefly applicable where, with cramps, coldness was complained of. In those cases in which there was an intolerance of external warmth, as indicated by the bed clothes being thrown off, great restlessness, and an active complaint of internal heat, the continuance of these medicines was decidedly injurious and always resisted. After reaction had commenced, their continued employment invariably induced congestion and fever, as was also the case if urged when recovery was protracted by a semi-state of collapse from four to five days. Camphor was in some cases promptly and obviously beneficial, giving comfort and support to the stomach; combined with hydrocyanic acid, it tended greatly to relieve the spasmodic and painful vomiting, retraction of the præcordia, and cramps.\*

\* A characteristic instance of this was in a male, aged 38; collapse four hours; pulseless; skin cold, moist, and slightly purple; evacuations and vomiting of rice-water frequent; intense and constant cramps, provoked upon the least motion; urine suppressed: the camphor and hydrocyanic acid gave immediate relief to the vomiting and stomach pains, and their hourly repetition was early accompanied by a subsidence of the spasm of the extremities. This patient recovered without consecutive fever. In two other cases some-

If pushed inordinately, following the same law as other stimulants and sedatives, these remedies conduced towards producing congestion and fever.

**Lime Water.** Lime water, given generally with milk, certainly had the power of very notably restraining sickness, and, to a less degree, the purging. It was used in many, but more especially in sixteen cases, of these eight died and eight recovered. Where the vomiting and purging were free, it appeared to be a useful medicine, and its administration attended by the best results, otherwise it was injurious. In one case it certainly acted injuriously, by checking the alvine discharges, which had become of a greenish colour after the previous exhibition of camphor and mercury.

**Acetate of Lead.** Acetate of lead was used in two cases, in the earlier stage with advantage; in both allaying the rice water vomiting, but in two other cases of advanced collapse its employment was without any apparent benefit. It is probably of no use after collapse is established.

**Cold Water and Ice.** The cases of collapse in Cholera may be divided into those in which there is an intense thirst, with a burning sensation of the stomach, and those in which there is a disinclination to drink, whether with or without this sensation. In the former the anxiety for cold drinks was most urgent; and, certainly, from the experience of those cases in which, with a free and frequent vomiting, the use of cold water was freely indulged, it was with an almost universally favourable result. Some \* very what similar relief was afforded; and in one of them the vomiting, previously distressing, was immediately checked.

\* Of the cases quoted below, the first is well worthy of note from the vast amount of water taken in.

J. W., male, ætat 24, having all the worst symptoms of collapse, being pulseless, the extremities blue, constant vomiting, &c., besides opium, ammonia, and lime-water, drank, in thirty-six hours, thirty gallons of water: he recovered, and without fever.

Another case, male, ætat 7, the collapse established for five hours, was pulseless, cold and sweating; the lower extremities to the knee were so discoloured as to have the appearance of having been rubbed over with black

conspicuous examples of this occurred;—of nine very urgent and advanced cases of collapse, accompanied by the most confirmed symptoms, and in which water was largely drunk, eight recovered, and one only died, and in this one the desire for fluid was not so markedly urgent.

Venesection was not largely practised, where used, however, Venesection. it obviously relieved the cramps, and that almost immediately. If resorted to on the first accession of "tinnitus aurium," or cramp to the heart, or oppressed breathing, its effect appeared not only prompt, but most beneficial,\* provided always that an amount of blood was not abstracted, which should arrest the vomiting and alvine discharges; in which case, though a subsidence of the previous symptoms was effected, a collapse of a comatose kind invariably proceeded to a rapid and fatal course.

lead. He was given calomel and opium, and lime-water, besides which, he drank incessantly of cold water, and with immediate relief: he had no consecutive fever. A similar case, male, ætat 28, likewise recovered without fever. Of the three other cases, two, being only three years old, had consecutive fever of three days; whilst the remaining one, who, though the thirst was not excessive, took water freely, yet died after twelve hours' collapse. Of cases where patients would not drink, and death resulted, several examples might be quoted. In two cases in which ice was freely taken, it was not only most grateful, but in both recovery took place. This, as well as cold water, were obviously most useful adjuncts to other treatment, especially that in which calomel and opium and lime-water were used.

\* Of the direct and beneficial effect resulting from the withdrawal of a few ounces of blood, as evidenced by the immediate relief of cramp of the heart and oppressed breathing, followed by a return of the circulation and an emergence from all the more urgent symptoms of collapse, one very remarkable instance occurred. J. G., male, æt. 20, had been in collapse six hours, was pulseless, surface of skin moist, hands sodden and purplish, vomiting frequent, evacuations occasional, cramps excessive, and no urine: complained now of pain of the heart and difficulty of breathing, which in two hours becoming more urgent, six ounces of blood were taken from the arm with direct and immediate relief, and from this time he gradually recovered. Though bilious stools and the urinary secretion were not fully established till eighteen hours afterwards, he yet recovered without any consecutive fever. In two other cases in which venesection was adopted, a cessation of cramps and great diminution of vomiting and purging took place; but death ensued without any rallying from that time. Both these were extreme cases, and had been in collapse nearly ten hours before the blood was taken away.

## External Applications.

The use of external applications, as turpentine, mustard, &c., was tolerably general—often relieving cramp of the heart and the painful spasm of the diaphragm. This relief was, however, chiefly afforded in the earlier period of collapse,—excepting then their application was accompanied by no ostensible relief; nor at any time was their application to the extremities markedly beneficial.

## Hot Air Bath

The hot air bath was used in fifteen cases, ten of which died, and five recovered. It was generally, though not always, a grateful remedy, and its immediate effect usually appeared to be advantageous. Nevertheless, unless used in the earlier stages of the disease, and, before collapse was fully established, it was injurious, for, if then applied, notwithstanding an apparent amendment, the more urgent symptoms recurred, and life subsided rapidly.

## Summary.

Such is a general statement of the treatment of Cholera, as pursued in Exeter in 1849. It may be thus briefly summed up. First, the preceding, or, as it is termed, the premonitory diarrhoea, and which is probably an early stage of the disease, was checked by the liberal use of absorbents, warm aromatics, and opium, as being remedies which would restore nervous energy and diarrhoea. The prevalence of this form of diarrhoea was very general, and was most successfully met by the above means; and they were also more or less successful, with the addition of lime water, and perhaps a mild mercurial, in checking that stage of the disease immediately preceding collapse, and which exhibited its specific nervous origin in the presence of cramps and a painless diarrhoea, the discharges from which were losing all character of alvine secretion, and assuming the watery and serous appearance of simple exudations.

When collapse became established, and the disease fully developed, the general basis of a treatment, which proved the most successful, was the prompt employment of mercury and opium, with a more sustained use of the former without the latter, together with the free drinking of cold water. Besides

these in the early period of collapse, much advantage was derived, as symptoms suggested, from the occasional use of lime water, stimulants, camphor and hydrocyanic acid, external stimulating applications, and the cautious use of venesection, this latter especially when the heart and respiratory organs were oppressed by cramp.

In the consecutive fever all stimulants proved injurious, while obvious advantage was derived from the use of saline effervescent and even mild aperients, with the free use of demulcent and light acid drinks, cold water, &c. ; in fact, everything was done to promote a return of action in the liver and kidneys. When the head was loaded and the eyes suffused, the application of a few leeches was most useful, and often attended by immediate relief. If a distressing nausea and sickness maintained itself or recurred, opium in the solid form, sparingly used, was admissible.

In bringing this little sketch to a conclusion, I hope I may be pardoned for repeating that which I have elsewhere stated (History of Cholera in Exeter in 1832), "that though there may be no specific cure for Cholera, its various stages, as in fever and other diseases, require management and treatment according to the phenomena developed and the individual constitutions in which they arise ; and that a wise conduct and judicious management of these are likely, under God's blessing, to be attended with benefit, while a wild and indiscriminate resort to specifics must inevitably be injurious."

## APPENDIX.

THE SANITARY COMMITTEE urgently calls the attention of the Public, and especially the Poor, to the following valuable suggestions for the Prevention of Cholera, which have been drawn up by a Committee of Physicians and Surgeons of Exeter, in conjunction with the Medical Officers of the Corporation of the Poor :—

**UNWHOLESOME FOOD.**—Avoid the use of unwholesome food, as tainted meat, stale fish, particularly stale shell fish, raw vegetables, unripe fruit, acid drinks, and even the incautious use of cold water when the body is over-heated.

**INTEMPERANCE.**—Avoid intoxication, or any approach to the intemperate use of spirits, wine, beer, and cider.

**BAD HABITS.**—Avoid undue fatigue, late hours, and all habits which weaken the powers of the constitution.

**LAXATIVE MEDICINES.**—Avoid the unadvised use of laxative medicines.

**CLEANLINESS.**—Cleanse and limewash your houses and out-buildings ; remove all animals, as pigs, poultry, rabbits, &c., from your Premises. Never allow stagnant water or filth of any kind to accumulate near your dwellings ; let the house-drains be well washed down every evening, even when they are well trapped ; if any offensive smell prevail, examine the state of the traps, and if possible, discover and immediately remove the cause. Attend carefully to the cleanliness of your persons daily.

**VENTILATION.**—Admit air freely into all your apartments by day, and when practicable by night, and most especially into rooms in which many persons are working together ; remove chimney boards, and all obstructions to the free current of air ; beds should be freely exposed to the air during the day.

**DIET.**—Let your daily diet consist of good wholesome solid food, as meat, bread, rice, sago, good potatoes ; and, drink moderately, cocoa, coffee, tea, milk.

**CLOTHING.**—Let your clothing be such as will keep the body warm and dry. In damp cold weather, wear flannel belts round the loins, which have been found by experience to be of the greatest advantage ; keep your feet dry.

**PREMONITORY SYMPTOMS.**—During the prevalence of Cholera, indisposition more or less prevails, some are affected with giddiness, general coldness of the body, prostration of strength or faintness, others with sickness, pains in the bowels, cramps or diarrhoea, experience has shown that if the Cholera be met at an early stage, it may be combated with every hope of success ; and as all the above feelings and symptoms are premonitory of an attack, apply without loss of time to the District Surgeon or your own private Medical Attendant.

**N.B.** District Surgeons are instructed to afford advice and medicines gratuitously, and such other means as the necessity and *emergency* of the case may require.

The Sanitary Committee have much satisfaction in stating, that after a careful consideration of the various improvements which have been from time to time adopted in Exeter, as well as of the measures which have now been devised, the Medical Gentlemen are of opinion this painful disease, should it again occur in this City, will not be attended with such fatality as on the previous occasion ; nevertheless the necessity for carrying out the above precautions, cannot be too strongly enforced ; for let it always be borne in mind, that those who are temperate in all things, cheerful and free from alarm, active and regular in their habits, early in their hours, and clean in their persons and houses, are the least liable to be attacked with Cholera, or any other serious Disease ; beyond this all must be confided to the care of an all-wise and most merciful Providence.

By order of the Sanitary Committee,

Exeter, 21st August, 1849.

R. HAKE, Clerk.