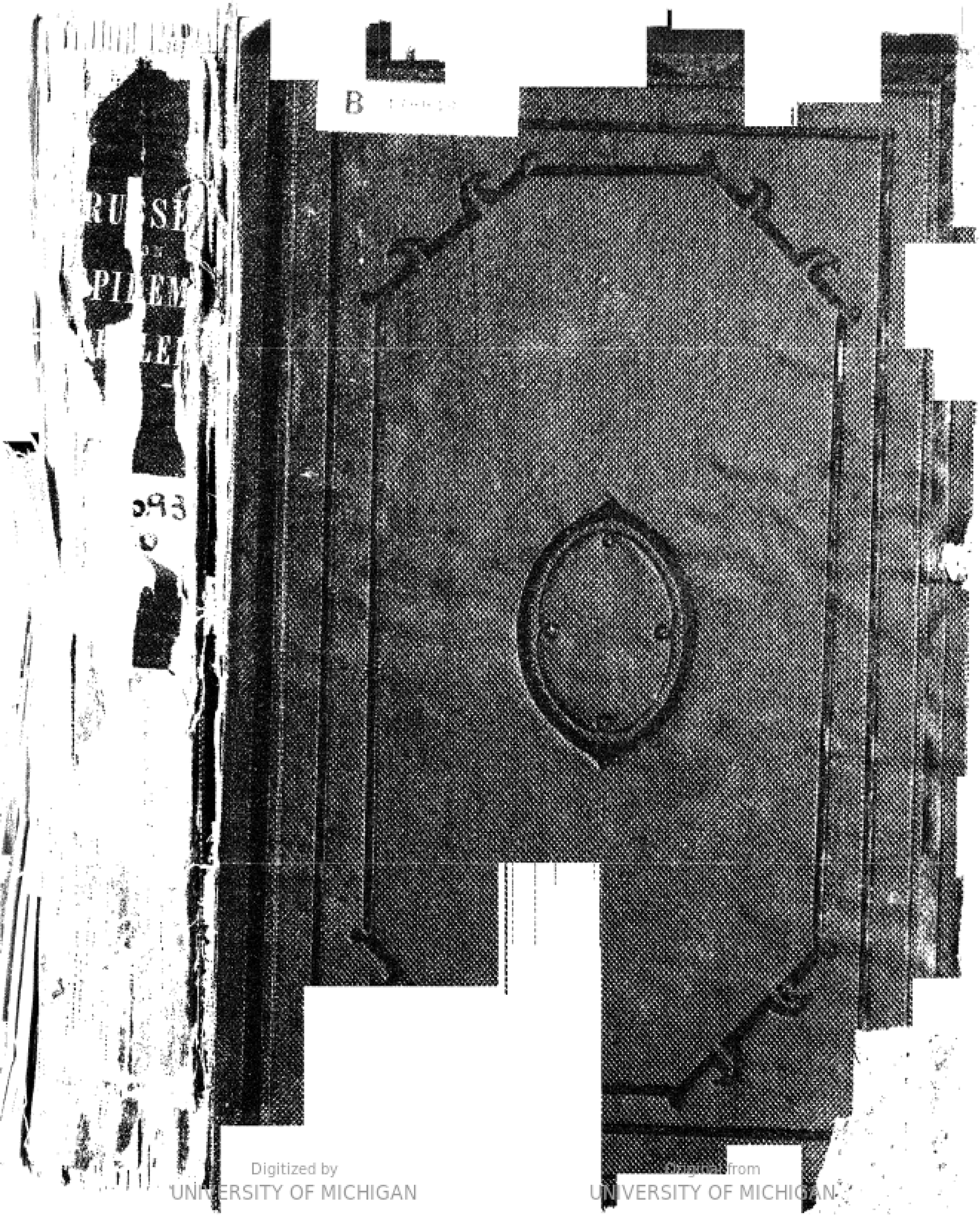

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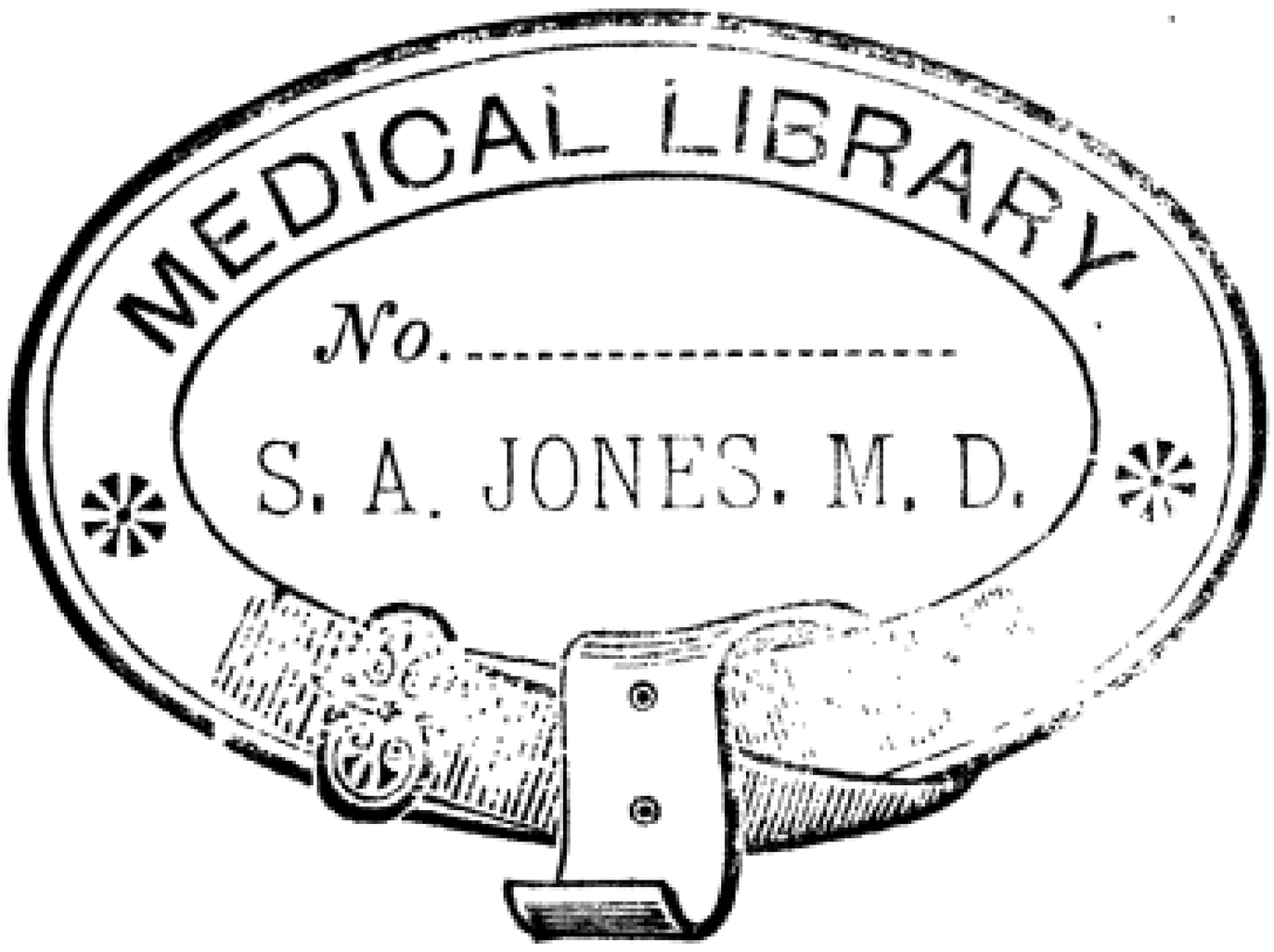

ON EPIDEMIC CHOLERA.

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A TREATISE

ON

EPIDEMIC CHOLERA

BY

J. Rutherfurd Russell, M.D. 1816 - 1866

WITH AN APPENDIX OF CASES TREATED IN THE EDINBURGH HOMŒOPATHIC DISPENSARY, 1848-49, AND A MAP SHOWING THE COURSE OF THE CHOLERA FROM INDIA TO BRITAIN.

LONDON:
WILLIAM HEADLAND, 15, PRINCES STREET, HANOVER SQUARE;
HYPPOLITE BAILLIERE, 219, REGENT STREET.
EDINBURGH: MACLACHLAN & STEWART; E. ALLSHORN, 63, HANOVER STREET.

MDCCCXLIX.

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RUTLAND SQUARE, *June* 1849.

MY DEAR DRYSDALE,

To you, as to an elder brother, I dedicate (without permission) this first publication of mine which has appeared without your name as well as my own on the title-page. Accept it as a tribute of affectionate respect for your character, and as the token of a friendship (*esto perpetua*) which has now lasted without interruption for the best part of twenty years.

Yours truly,

J. RUTHERFURD RUSSELL.

J. J. DRYSDALE, ESQ., M.D., Liverpool.

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PREFACE.

That the Cholera, which is now committing such frightful havoc in Paris, will, before long, prevail as an epidemic in this country, hardly admits of a doubt; and while it would serve no good purpose to conjecture the particular places which it is most likely to select for its first invasion, it is obviously the imperative duty of all to be prepared to do their utmost to mitigate the sufferings from a pestilence which no human power can avert. How much may be done by a judicious anticipation of the event is shown by what took place in Edinburgh. The subject had been considered by the Committee of the Homœopathic Dispensary a year before the cholera made its appearance; and three days after its existence in Edinburgh was announced, our whole machinery was in full operation. We were the first in the field, and the consequence was that we treated about a fourth of all the cases of cholera which occurred here. This we could not have done but for the liberal support given us by our friends. Not only

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were we enabled to meet the unusual outlay required for keeping the Dispensary constantly open, but a fund was placed at our disposal by which we could relieve the most destitute after they had recovered from cholera, and thus float them over the period of convalescence, and save them from starvation or pauperism. The good thus effected was very great; and we only regret that the supply was so temporary. We cannot but think that the physician is the proper channel of relief to the poor; and that if it were possible to have a relief fund attached to each Dispensary, hundreds might be saved by it from falling upon the parish. Just consider how directly and unerringly all the money given goes to its destined object—not a penny is spilt by the way; and compare this plan with the cumbrous one of parish officers, inspectors, and all the expensive machinery of ordinary relief. But, moreover, look to the immeasurable moral superiority; death is the great leveller of rank, and a deadly disease begets a certain feeling of brotherhood between the sick and the attendant. To take money from the hand of such an attendant at such a time brings with it no sense of degradation; and if the physician tell the poor sufferer that he himself has received the money from a kind friend for the purpose of relieving him, the noblest sentiments of gratitude to the unseen donor are called forth. And how easily could such a fund be raised! During the prevalence of cholera, from one individual—and one not rich, except in good works—we received a guinea a-week,

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obtained from benevolent persons who readily contributed to so manifest a charity. Why should such a stream as this not be perennial? If we could afford to have a permanent house-surgeon, and a relief fund to the amount of a guinea a-week, to be laid out in food for patients recovering from severe illness, we could confer an incalculable amount of benefit upon the poor. But the question seems to be now, not whether we shall be enabled to enlarge our Dispensary, but whether we shall be able to keep it up on its present scale? The amount of subscriptions this year is by no means creditable to the large body of wealthy adherents to Homœopathy over Scotland, for we have patients from all parts of the country; and when it is recollected that more than *twelve thousand* patients have applied for relief since the Institution was opened, and that the annual expense is not above eighty pounds or so, we cannot help thinking that it would be a disgraceful exhibition of selfishness if the Institution were allowed to languish for want of proper support; and it would lead us to believe that the very handsome sums that poured in at the time of the cholera were wrung rather from the fears than the charity of those who gave them. This we know was not the case in many instances; but unless the efficiency of the Institution be maintained now when the fear of the pestilence is gone, we cannot help ascribing a part of the apparent generosity to some such ignoble source.

Before concluding, we would tender to Dr. Atkin of

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Hull our acknowledgments for the assistance he has afforded us. When acting as House-Physician to the Dispensary, not only did he discharge all the duties required by his office in the most efficient manner possible, but also prepared the valuable tables of which we have had occasion to make use in our work, besides giving us valuable aid in other parts of it. We would also thank Mr. Adie, our townsman, and distinguished optician, for the weather tables which he kindly furnished; and Mr. Alexander Bain, of the Board of Health, for his kindness and attention in giving us every information in his power which we required of him.

We take this opportunity of informing all who are interested in it, that we are now collecting materials for a life of Hahnemann, and we should gratefully accept any assistance from those who have either had the means of acquiring accurate information regarding him, or who could favour us with any of his letters.

We shall not attempt any apology for the errors and omissions of this book, or the blemishes and inaccuracy in its composition, farther than that it was necessary, in order to make it of any use, to prepare it with the greatest possible speed, that it might be accessible before the cholera lighted upon the country; and those who know what it is to write a book at the intervals of anxious business, and with the printing-press rattling at one's heels, will be the first to make due allowance for the imperfections of the present publication.

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BLACK SEA
CASPIAN SEA
ASIA MINOR
SYRIA
PERSIA
EGYPT
ARABIA
Libyan Desert
Arabian Desert
Persian Desert
Great Salt Desert
BALTIC SEA
MEDITERRANEAN SEA
RED SEA
Oasis of Tuat
Oasis of Ghadames
Oasis of Fezzan
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MAP SHOWING THE

COURSE OF THE CHOLERA

FROM

INDIA TO BRITAIN.

CONSTRUCTED

BY W & A K JOHNSTON GEOGRAPHERS TO THE QUEEN EDINBURGH.

TO ILLUSTRATE A TREATISE ON EPEDEMIC CHOLERA

BY

J. RUTHERFURD RUSSELL M.D.

1849.

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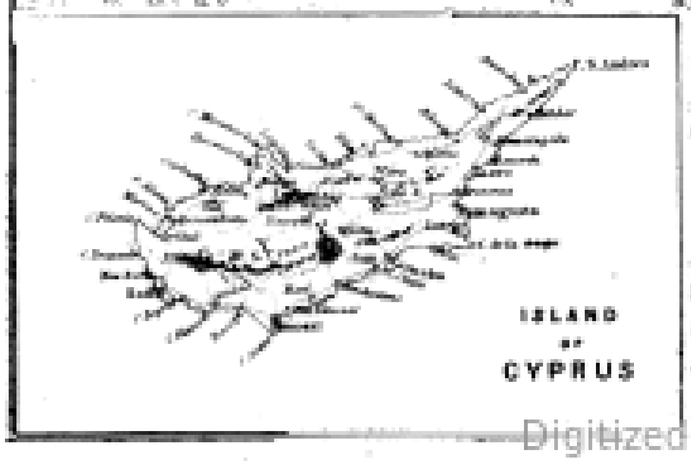

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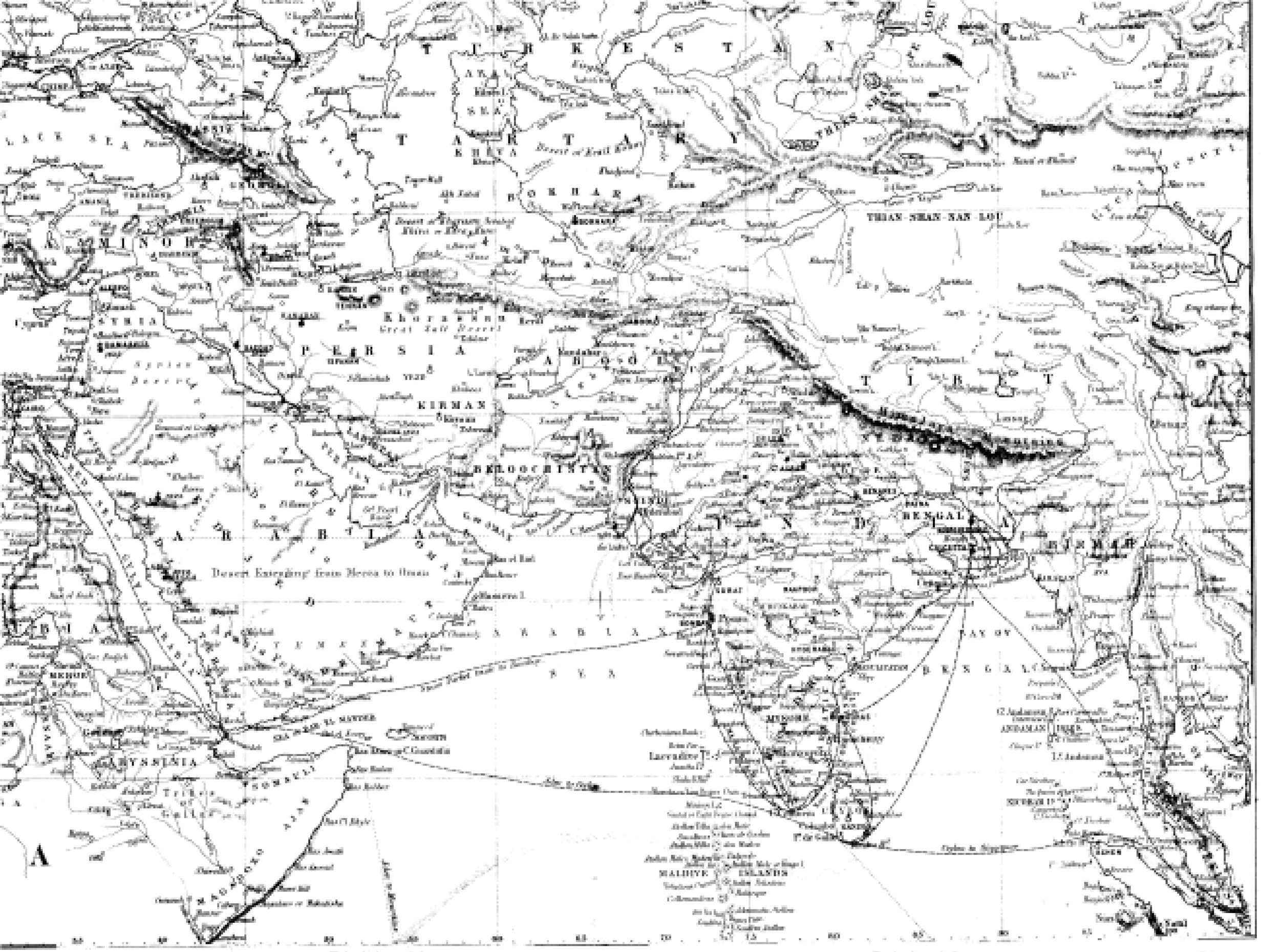

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TREATISE ON EPIDEMIC CHOLERA.

INTRODUCTORY CHAPTER.

ON EPIDEMICS IN GENERAL.

THE appalling destruction of human life, caused by some of the pestilences in former ages, was so much the most striking feature about them, that to it almost alone attention was directed. The history of the Plague of the 14th century was the narrative of death: the very name of the disease expresses this idea. It was called in one language "La Mortalège grande," the great mortality; in another, "Der schwarze Tod," the black death. And no wonder it should be so, when we read, "that in Cairo, from ten to fifteen thousand died in a single day, and that for many days successively. In China, more than thirteen millions (nearly the population of England) are said to have died. India was depopulated. Tartary, the Tartar kingdom of Kaptschuk, Mesopotamia, Syria, Armenia, were covered with dead bodies. The Kurds fled in vain to the mountains. In Caramania and Cæsarea *none* were left alive. On the roads, in the Camps,

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in the Caravansaries, unburied bodies alone were seen." "Cyprus lost almost all its inhabitants; and ships without crews were often in the Mediterranean, as afterwards in the North Sea, driving about and spreading the Plague wherever they went."* "It was reported to Pope Clement at Avignon, that, exclusive of China, twenty-three millions and upwards had fallen victims to the Plague throughout the East." Sixty thousand died at Florence; a hundred thousand at Venice; a hundred thousand at London; fifty thousand at Norwich. Many towns were bereft of their inhabitants. "When the Plague ceased, men thought they were still wandering among the dead, so appalling was the livid aspect of the survivors, in consequence of the anxiety they had undergone, and the unavoidable infection of the air." Is it possible for us to realize the horrors of such scenes? In ordinary times, death is the exception—life the rule; all signs of death are immediately removed; and although it is continually occurring, it is as quickly concealed. But when death becomes the rule, and life the exception, how inconceivably awful must be the feeling! If solitary confinement deprive a man of reason, what must it be to be left the solitary tenant of a city or a ship? The mind cannot take in the horror and loneliness of so frightful a condition. To be alive amid silence and corruption—surely the most agonizing form of death would be less terrible than to live in such a tomb. No wonder, we repeat, that those who looked on such plagues found nothing in them of any interest except the results.

To us, however, who can calmly contemplate fatal epi-

* This recalls to one's mind the scene of "the ancient mariner," and may have given the hint to the poet Campbell, who, in his picture of horrors which must environ the last of the race, "who shall creation's face behold, as Adam saw its prime," describes how

—— ships were drifting with the dead,
To shores where all was dumb.

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demics, their essential characteristic is not the number of their victims, which depends upon accidental circumstances. And it is of great importance that we should remember this; for in turning from such descriptions of death to the recent or present epidemic of Cholera, in some parts of this country, if the only interest were derived from the bills of mortality, it would immediately subside, when we found but a very trifling increase in the numbers on these tables, or perhaps no increase at all. Although in a life-insurance point of view, the cholera may be quite insignificant, yet as a member of the class of fatal epidemics, it is most interesting and important; and who knows that it may not become invested with the more terrible interest of being a great mortality by becoming a general, instead of a partial disease? The mortality of cholera is very great; if it were as wide-spread as it is malignant, the result would be frightful. And we should bear in mind that we can do but little to prevent its diffusion, and indeed not much more to lessen its fatality. Thus we find this epidemic to be generically bound up with former ones; and we believe it is only by investigating what facts are common to all, that we shall arrive at a knowledge of the laws that regulate the occurrence and the course of each, and shall learn why they have so baffled all attempts to arrest their progress, and neutralize their destructive power.

One of the most striking features of many former plagues is that they have not occurred without previous warning. They appear to have had their origin in the planet we dwell on; and before their coming, the earth gave signs of some great internal disturbance. The pestilence which swept its surface, seemed the relief to those convulsions which shook its frame. Or taking a higher point of view, we may regard the wonderful succession of strange phenomena which pre-

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cede a great destruction of human life, as so many indictments served upon our race by the Judge of the world, before its guilty inhabitants are cited to His tribunal. May not the recurrence of such a judgment, in an age like ours, when by the wonderful triumphs of scientific perseverance, man seems to have got the better of the earth altogether, and spreading it over with a tissue of rails and wires, as with a system for circulation and nervous communication, to have fashioned it into an obedient organism over which he presides, be a reassertion of the often repeated and as often forgotten fact, that "the earth is the Lord's, and they that dwell thereon?" If it be superstition which has led man in all former ages to associate the signs in the sky with the great events among the nations of the earth, in the instance of plagues at least it is a very reasonable belief, fully borne out by the history of the times. After a general observation to the effect that "the black death" was preceded by unusual terrestrial convulsions,* Hecker continues:—"The series of these great events began in the year 1333, fifteen years before the Plague broke out in Europe. They first appeared in China. Here a parching drought, accompanied by famine, commenced in the tract of country watered by the rivers Kiang and Hoai. This was followed by such violent torrents of rain in and about Kingsai, at that time the capital of the empire, that, according to tradition, more than four hundred thousand people perished in the floods. Finally, the mountain Tsincheou fell in, and vast clefts were formed in the earth. In the succeeding year (1334) passing over fabulous traditions, the neighbourhood of Canton was visited by inundations; whilst in Tche, after an unexampled drought, a plague arose which is said to have carried off five

* The Epidemics of the Middle Ages, by J. F. C. Hecker, M.D. Translated by B. S. Babington, M.D., F.R.S. London, 1844.

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millions of people. A few months afterwards, an earthquake followed, at and near Kingsai ; and subsequently to the falling in of the mountain of Ki-ming-chan, a lake was formed of more than a hundred leagues in circumference, where again thousands found their grave. In Houkouang and Ho-nan, a drought prevailed for five months ; and innumerable swarms of locusts destroyed the vegetation ; while famine and pestilence, as usual, followed in their train. Connected accounts of the condition of Europe before this great catastrophe are not to be expected from the writers of the fourteenth century. It is remarkable, however, that simultaneously with a drought and renewed floods in China in 1336, many uncommon atmospheric phenomena occurred, and in the winter, frequent thunderstorms were observed in the north of France ; and so early as the eventful year of 1333, an eruption of Etna took place. According to the Chinese annals, about four millions of people perished of famine in the neighbourhood of Kiang in 1337 ; and deluges, swarms of locusts, and an earthquake which lasted six days, caused incredible devastation.

"The signs of terrestrial commotion commenced in Europe in the year 1348, after the intervening districts of country in Asia had probably been visited in the same manner.

"On the island of Cyprus the plague from the East had already broken out ; when the earthquake shook the foundations of the island, and was accompanied by so frightful a hurricane that the inhabitants, who had slain their Mahometan slaves in order that they might not themselves be subjugated by them, fled in dismay in all directions. The sea overflowed, the ships were dashed to pieces on the rocks, and few outlived the terrific event, whereby the fertile and blooming island was converted into a desert. Before the earthquake a pestiferous wind spread so poisonous an odour

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that many overpowered by it, fell down suddenly and expired in dreadful agonies. * * *

"Pursuing the course of these grand revolutions further, we find notice of an unexampled earthquake which, on the 25th of January 1348, shook Greece, Italy, and the neighbouring countries. Naples, Rome, Pisa, Bologna, Padua, Venice, and many other cities suffered considerably: whole villages were swallowed up—castles, houses, and churches were overthrown, and hundreds of people were buried beneath their ruins. In Carinthia thirty villages, together with all the churches, were demolished; more than a thousand corpses were drawn out of the rubbish; the city of Villach was so completely destroyed that very few of its inhabitants were saved; and when the earth ceased to tremble it was found that mountains had been removed from their position and many hamlets were left in ruins.

"More destructive earthquakes extended as far as the neighbourhood of Basle, and recurred until the year 1360 throughout Germany, France, Silesia, Poland, England, and Denmark, and much farther north.

"Great and extraordinary meteors appeared in many places, and were regarded with superstitious horror. A pillar of fire which, on the 20th of December 1348, remained for an hour at sunrise over the Pope's palace at Avignon; a fireball which in August of the same year was seen at sunset over Paris, and was distinguished from similar phenomena by its longer duration, not to mention other instances, mixed up with wonderful prophecies and omens, are recorded in the chronicles of that age.

"The progress of connected natural phenomena from east to west—that great law of nature—is plainly revealed, which has so often and evidently manifested itself in the earth's organism, as well as in the state of nations dependent upon

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it. In the inmost depths of the globe that impulse was given in the year 1333, which in uninterrupted succession for six and twenty years shook the surface of the earth, even to the western shores of Europe. From the very beginning the air partook of the terrestrial concussion, atmospheric waters overflowed the land, or its plants and animals perished under the scorching heat. The insect tribe was wonderfully called into life, as if animated beings were destined to complete the destruction which astral and telluric powers had begun. Thus did this dreadful work of nature advance from year to year: it was a progressive infection of the zones, which exerted a powerful influence both above and beneath the surface of the earth."

We have quoted the above passages at considerable length to bring distinctly into view two important facts. The first is, that fatal epidemics which affect the inhabitants of the earth generally are in some way or other connected with telluric phenomena, and that their course is in a given direction, from east to west. In the words of a French author on the subject :—" Le grand mouvement des phénomènes physiques de l'univers se fait d'orient en occident, tel que celui de la lune et des autres constellations, ainsi que du flux et reflux de la mer, tandis que la terre seule opère sa révolution en sens contraire.

" Le genre humain a pris naissance en orient ; il s'est propagé de l'est à l'ouest, des rives de l'Euphrate à l'océan occidental : ainsi les premiers enfants de la terre peuplèrent l'Inde, l'Afrique, le sud-est de l'Europe. Dans la suite les Scythes et les Tartares franchirent les monts Ourals et le Caucase pour venir habiter la Russie, la Turquie, et les bords de la mer noire et les grands fleuves de l'Europe. De-là sortirent les Huns, les Lombards, les Alains, les Vandales, les Suèves, les Germains, les Galles, les Goths, les Visigoths,

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les Bourguignons qui s'établirent le long du Danube, du Rhin, et de la mer du nord. Delà comme un torrent débordé et impétueux ils s'élancèrent dans les Gaules et l'Ibérie. Plus-tard, les Maures vinrent aussi de l'orient s'établir dans cette dernière contrée, tandis que les Normands envahissaient la Gaule occidentale, et les Saxons la Grande Bretagne. On voit encore de nos jours des peuplades partant de l'est de l'Europe pour aller fonder des colonies en Amérique. Enfin toutes les irruptions des Barbares ont eu lieu dans la direction de l'orient à l'occident.

"La même direction s'observe à l'égard des épidémies, ainsi la Peste, la Variole, la Rougeole, la Lèpre nous furent apportées de la Turquie, et de la Syrie, par les Maures et les Juifs chassés par les Califes et les Croisés. La peste noire du 14me siècle prit naissance au Katai en Chine, et vint terminer ses ravages et son existence sur les rivages de l'océan. Les épidémies catarrhales de 1239, 1311, 1323, 1400, 1427, 1557, 1580, et plusieurs autres qu'on appelle la Russe, la Muscovite, l'Influenza, la Dando, la Coquette, &c., sont toutes venues du nord-est de l'Europe et ont expirées sur les bords de l'Océan Atlantique. Le Typhus est venu de la Hongrie, au 16me siècle, on l'appela fièvre Hongroise, enfin le Cholera nous est arrivé des extrémités orientales de la Chine et de l'Inde. Nous pourrions citer aussi de nombreuses épizooties et notamment celle de 1814 qui ont suivi la même direction."*

If we had any means of ascertaining the natural succession of these phenomena, it would be an interesting addition to our knowledge; but there are insurmountable difficulties in doing so with regard to occurrences spread over so vast a tract of the earth, and of which such imperfect accounts are preserved. The second act may have commenced at one place be-

* Histoire Méd. des Maladies Epidém. Par J. A. F. Ozanam. Vol. ii. p 254.

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fore the first is finished at another no great distance off ; and in the narrative of the occurrences two or more may have been blended, and thus at the outset create inextricable confusion.

The only instance in ancient and strictly authentic history where we have a series of such occurrences may be considered by many as altogether out of the pale of scientific investigation, belonging to the *preter*natural, not to the natural order of events. We refer to the Plagues of Egypt, described by Moses. To prevent misunderstanding, we are anxious to begin by saying, that supposing the phenomena in question to be strictly in accordance with natural laws, this does not at all imply that they are not also miraculous. The meaning of a miracle is not to introduce a new power disconnected with the ordinary operations of nature, and so tending rather to strengthen than to uproot the mischievous error of regarding these operations as resting on something else than the constant Divine Will. It is rather by a startling and unusual exhibition of the same power by which all things consist from day to day, to recall the attention of those who are thus emphatically addressed to the fact that all these agencies, (in the particular sphere of the miracle,) are under the immediate command of a supreme moral Governor, at whose bidding they utter these strange voices. To effect this object it is not necessary that any known laws of nature be suspended, far less violated ; it is enough that the events be such as cannot at the time be referred to any known sequences, on account of their nature, their intensity, or their concentration, as it were, into one point, and that point indicating a great moral purpose.* The miracle will be

* The miracle is not *a greater* manifestation of God's power than those ordinary and ever repeated processes (by which nature is sustained); but it is a different manifestation. By those other God is speaking at all times, and to all the world ; they are a vast revelation of Him. "The invisible things of Him are clearly seen, being understood by the things that are made, even His

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much more obvious, if the event be foretold with a minuteness of detail far beyond the powers of science to attempt, and its moral purpose be at the same time expressly announced. Without such announcement it may be unintelligible. Had Moses not spoken to Pharaoh, and proclaimed beforehand the definite object to be served by the terrible catastrophes which were so soon to follow, the tyrant, though terrified—"for conscience doth make cowards of us all"—might have been as much at a loss to account for the dreadful scenes he witnessed as we may suppose the Pope to have been when he saw a pillar of fire resting over his palace at Avignon.

We make these observations on the assumption that the succession of terrific phenomena rising step by step to the climax of the destruction of the people of Egypt, by means of which the children of Israel were set free, are capable of explanation by natural laws, and therefore, besides conveying, as they always must to the devout mind, one of the most emphatic moral lessons on record, may also be a proper object of scientific reference.

In the observations on the plagues of Egypt which we are about to make, we have taken Hengstenberg* for our guide;

eternal power and Godhead." (Rom. i. 20.) Yet from the very circumstance that nature is thus speaking unto all—that this speaking is diffused over all time, addressed unto all men—from the very vastness and universality of this language it may miss its aim. It cannot be said to stand in nearer relation to one man than to another—to confirm one man's word more than that of others—to address one man's conscience more than that of every other man. However it may sometimes have, it must often lack a peculiar and personal significance. But in the miracle wrought in the sight of some certain men, and claiming their special attention, there is a speaking to them in particular. There is then a voice in nature which addresses itself directly to them—a singling them out from the crowd. It is plain that God has now a peculiar word, which they are to give heed to—a message to which he is bidding them listen.—*Notes on the Miracles of our Lord.* By Richard Chevenix Trench, M.A., Professor of Divinity, King's College, London, &c. &c. p. 11.

* Egypt and the Books of Moses. By Dr. E. W. Hengstenberg, Professor of Theology at Berlin. Translated by R. D. C. Robins. American edition.

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and all Biblical students are aware that in his name they have the best security both for the learning and soundness of the interpretation of Scripture.

To have a clear idea of the occurrences described in the beginning of Exodus, we require to determine the relative locality of the Israelites and Egyptians, and also the time of year of the events. The land of Goshen seems to have been the region east of the Tanitic arm of the Nile, as far as the Isthmus of Suez, on the border of the Arabian desert. It was therefore a border country, out-lying, not surrounded by other Egyptian territory. The ten plagues must have occurred between the month of July and the following month of April.

The absence of contemporary history prevents our knowing whether they were confined to Egypt, or extended over a larger portion of the earth. It is probable that some remarkable meteorological phenomena had occurred at the source of the Nile, or, at all events, high up the river. But whether these supposed phenomena were attended by a pestilence or not, we have no means of ascertaining.

The first four plagues seem all to have arisen from a common cause—an extraordinary inundation of the Nile. The expression that the waters were turned into blood means that they looked like blood, and were unfit for use: as when Joel says—"the sun shall be turned into darkness, and the moon *into blood*,"—that is, shall have the colour and appearance of blood. Generally speaking, the Nile water is excellent for drinking; but in seasons of great heat, when the river has been unusually low, on its first rising it is quite discoloured, and undrinkable. Thus, "in the year 1199 the increase of the Nile was smaller than it had ever been known. About two months before the first indications of the inundation, the waters of the river assumed a green

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colour; this increased by degrees, and it became putrid and offensive to the taste; sick persons avoided drinking from it, and drank well-water. By boiling, its smell and taste became worse. There also appeared in it worms and other animals which live in stagnant water." (In De Sacy, on Abdollaliph, p. 332.) Again, in 1673, the Nile reddened in July, and continued so till December. (*Ib.* p. 346.) The plague consisted in the excessive degree of reddening and putridity. The ordinary amount of impurity was removed by putting the water into vessels of wood and stone, whereby a deposit took place, and the water above became clear; but in this instance it remained red and blood-like in all the vessels of the Egyptians.

The second plague—that of the frogs—is simply a greatly increased number of those animals, which, by all accounts, are generally abundant enough in Egypt. In some parts of Italy we have seen frogs in such swarms on the dry ground that it was almost impossible to set down the foot without crushing some of them. "In the summer of 1831, I often observed immense flocks, if I may use the term, of young toads in the vicinity of Sunderland, which I pointed out to several of my friends."* .

The expression used to describe the third plague is properly translated gnats. All travellers speak of gnats as an ordinary plague of the country. They pursue the men, prevent their eating, disturb sleep, and cause swellings which are very painful. They are most abundant after the rice harvest, that is, at the end of the inundation of the Nile, and would naturally be increased by an excessive extent of flooded land.

The fourth plague was that of the flies. These, too, torment the inhabitants of Egypt even yet to a great extent. One traveller says: "The most numerous and troublesome insects

* The Cholera of Sunderland, by W. Reid Clanny.

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in Egypt are flies. Men and animals are grievously tormented by them. It is impossible to form an adequate conception of their fury when they wish to fix themselves on any part of the body. If they are driven away, they light again the same instant, and their pertinacity wearies the most patient."

We class these first four plagues together, because they are of a local character—being peculiar to the climate and geographical conditions of Egypt. However, we may notice in passing, that a great increase of insect life has frequently been observed to attend or precede many epidemics, and, among others, the cholera. So that perhaps we may legitimately include the inundation of frogs, gnats, and flies in the proper series of antecedents of the subsequent great mortality, although the nature of the soil of Egypt gave it what we may call a predisposition to suffer from them to an unusual degree, and that they should be of an unusual kind.

The fifth plague was the destruction of cattle by a murrain. Before an epidemic, it is not uncommon to have a disease among the lower animals. A most deadly distemper prevailed among the cattle in this country during the years 1846-47. Whether we have a right to regard the potato disease as the first indication of the approach of an epidemic, is certainly a curious question—as if beneath the first wave of noxious influence, there drooped the most sensitive of the vegetable kingdom, under the second there fell the cattle, and under the third man—the disease in each case being conditioned by its subject.

The sixth plague—that of boils—was probably some painful but not deadly cutaneous eruption. We have an example of a mild epidemic preceding a deadly one in the influenza of 1847. A succession of epidemics increasing in severity has also been noticed. Thus in the years 1733, 1738, and 1743, there raged a succession of epidemics quite

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different from one another. They extended over both the Old and New World, and are called by French writers La Grippe, La Folette, and La Russe.*

The seventh plague was a tempest. We have before had occasion to notice the fact, that atmospheric commotions, attended with electrical phenomena, have in almost all instances been observed to usher in a great pestilence. In lower Egypt, tempests attended with hail and thunder are not uncommon.

The eighth plague was the locusts. We have already adverted to the increase of insect life when epidemics prevail. In the instance now under consideration, they seem to have been brought in unusual numbers by an east wind, and carried off again by a west wind, which was of a very peculiar kind, known at present by the name "chamsin."

The darkness which overshadowed all the land of Egypt, probably arose from the blowing of this "chamsin" with great violence, attended perhaps with some electrical phenomena, as in the instance thus described by an eye-witness:— "The sun, without being veiled with clouds, had been shorn of its beams; it gave only a white and colourless light more feeble than the moon. A reddish dusky appearance filled the region. With wounded eyes and nose so filled that we could scarcely breathe, we strayed from one another, lost our way, and found our dwellings with great difficulty, feeling along by the walls. On the following morning, the same cloud of dust was driven in like circumstances along the Lybian desert. It followed the mountain range; and when we believed ourselves free from it, the west wind turned it back. Lightnings shot feebly through these dark clouds; all the elements appeared to be in commotion; the rain mingled with the lightning gleams, with wind and dust;

* Ozanam, Hist. Méd. des Malad. Epid. p. 87.

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everything seemed returning to chaos and old night."* An old chronicle of the eleventh century records:—"There occurred a great and violent storm, accompanied by darkness. Edifices were destroyed and houses demolished; moreover, Egypt was covered with so thick a darkness, that all believed the Resurrection had come."

In speaking of the year 1760, in which the plague broke out at Aleppo, Russell says:—"It may be added that the present period had been preceded by famine, by uncommon diseases, and by earthquakes; a comet had been observed in the spring of 1759, and in the present year an eclipse of the sun—all which portentous events have ever, in the East, been considered as forerunners of a pestilence."

The following extract is taken from the *Times* newspaper of the 5th of May of this year, and the very curious phenomena described were coincident with a new outbreak of epidemic cholera:—"We make the following extract from a report of the proceedings of the Royal Dublin Society in a late number of the *Dublin Freeman's Journal*:—'Professor Barker presented to the notice of the Society a bottle containing a portion of black rain which had been transmitted to him from Carlow, with a view to satisfy the scruples of many persons who appeared to doubt that rain of this description had fallen. He had received communications on the subject from persons residing in several of the districts in which the rain had descended, and he was in a position to state, not only that such rain had actually fallen, but to mention the space of country over which it had been diffused. The specimen which he presented to the Society had been sent to him from Carlow, accompanied by a letter, in which the writer mentioned that at the time of its collection it was uniformly black, and resembled ordinary writing

* Denon, vol. i. p. 285.

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ink ; but he (Dr. Barker) found that after allowing it to stand for a short period, the black colouring matter separated from the water with which it had been mixed, rendering the colour of the rain much lighter than at first. The places in which this phenomenon occurred were Abbeyleix, Carlow, Kilkenny, and Athy, from which it would appear that the black shower had extended over an area of more than 400 square miles. *As far as he had been able to ascertain, it occurred about six o'clock in the evening of the* 14*th instant, being preceded by such extreme darkness that it was impossible to read except by candle-light.* After this darkness had existed for some time, a hail-storm, attended with vivid lightning, but without thunder, occurred, and when this subsided, the black rain fell. It was mentioned by his Carlow correspondent, that upon examining a quantity of this rain just after it had fallen, he found it had an extremely fœtid smell, and a very disagreeable taste ; that it had left a stain upon some clothes on which it had fallen, and that cattle refused to drink it. At Abbeyleix and Athy, where the shower descended at the same moment, the appearance of the rain was precisely similar to that which fell in Carlow, but it was unaccompanied by the lightning which had been observed at the latter place. Dr. Barker then stated that as yet he had not been enabled to make a complete chemical analysis of the rain.' "

With reference to the tenth plague, which interests us most at present, we may quote the following observations from Hengstenberg :—"It may be proper to remark here, before we proceed with the tenth plague, that the phrase 'all the first-born,' must not be pressed too far. The whole tenor of the narrative is opposed to such a proceeding, and particularly the declaration, 'there was no house where there was not one dead,' since in every house there was not a first-born.

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"If we take into view the time in which the last plague occurs, we cannot deny that we find something analogous to it in a pestilence described by Minotoli. It is not material whether it be allowed that the plague raged at so early a period, or that another similarly destructive disease existed in its place. The plague, he says, commonly makes its appearance at Cairo about the end of March or the beginning of April. The miasma is communicated merely by contact. Local causes, however, increase its malignancy; and even the prevailing winds have an important influence. *With an uninterrupted chamsin, the plague increases frightfully, and speedily takes off those who are attacked by it.*

"Compare also the 'description,' where, in accounting for the sickness, it is imputed mainly to the chamsin; and it is remarked, that great inundations, which leave numerous morasses, always precede destructive epidemics."

The sparing of the Israelites, wonderful as it undoubtedly was, is not without analogy. For example, in 1827, the inhabitants of Gooty suffered severely from the cholera; while the regiment which was there, and furnished guards to the town, enjoyed perfect health. On a sudden this was reversed; the soldiers were attacked, and the townspeople escaped.* And Cardem, in speaking of the plague at Basle, says, that it attacked only the Swiss, and spared the Germans, French, and Italians who lived in the town.† In the recent occurrence of the cholera at Tooting, the children were the only sufferers; probably, however, in this case from improper aliment and other reasons, which do not apply to the other instances of the same kind. There are several similar examples on record.

We may thus perhaps conclude that in the earliest of hu-

* Treatise on the Epidemic Cholera, by A. T. Christie, M.D. 1833. P. 15.

† Ozanam, Hist. Méd. des Malad. Epid. Vol. i. p. 77.

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man records, coeval with the Pyramids, there is preserved an epitome of the future history of great epidemics, which devastated nearly the whole earth ; and so far from divesting the wonders in the land of Egypt of their Divine significance and strictly miraculous character, it seems to us that by viewing these successive events as produced by the ordinary laws of nature, and converted into direct judgments by having been predicted and interpreted, and considering them as the type of all future pestilences, we shall see in these, too, a work of judgment and of mercy, not the less significant because there is now no prophet to foretell their approach and warn us of the particular offences they are meant to chastise, and no inspired historian to give the true meaning, as well as the faithful picture of the calamity. And possibly a more thoughtful consideration of the matter might bring us back to the mind of an elder age, when the moral laws of the universe were recognised as the true basis of the physical, and man's wellbeing and immunity from distress and misery were not rested on his obedience to the laws of this world alone. As in the time of Pharaoh, submission to the Word of the Lord was the only escape from the pestilence ; so in all future ages obedience to His Will, in its fullest sense, by all mankind, were it possible, could alone avert, by making unnecessary, those fatal, ever new epidemics which have so often scourged our race. In the words of the venerable Ambrose Paré on "Le vray et Souuerain remede contre la peste." "Et d'autant plus que ce mal est grand, d'autant faut il recourir promptement au remede qui est seul et general : c'est que grands et petits de bonne heure implorions la misericorde de Dieu par confession et desplaisance de nos forfaicts, auec certaine deliberation et propos de nous amender et donner gloire au nom de Dieu, cherchant en tout et par tout de luy obeyr et complaire

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suiuant la saincte parole sans estriuer à l'encontre de luy par nos desordonées passions comme nous auons fait et faisons iournellement."*

There is one other curious circumstance connected with great epidemics to which we must briefly advert before leaving the general consideration of the subject, and it is the strange and powerful effect they have or had upon the minds of men. Scarcely had "the black death" subsided, when a delusion of the most extraordinary kind began to prevail. It was called the Dance of St. Vitus, and consisted in the performance of a succession of dreadful contortions of the body, attended with screaming and foaming at the mouth. It spread like a demoniacal possession over a great part of Europe. Instead of genuine devotion, the proper effect of a great calamity, we have its most hideous counterfeit, in an abandoned and most revolting superstition. It lasted for many years, and never since has reappeared as a general epidemic; although it has frequently prevailed in limited districts of this and other countries, and even yet it is not altogether extinct, occurring every now and then in the sporadic form.

How far the cause of such strange phenomena is moral, and how far purely physical, is an insoluble problem at present. We know that certain natures are very powerfully impressed by telluric influences,† and we have seen that

* Les Œuvres d'Ambroise Paré, &c., &c., p. 569. Lyons, 1641.

† We may give as an instance the following anecdote of Goethe, told by Eckermann :—

"*Thursday, Nov.* 13, 1823.

"Some days ago, as I was walking one fine afternoon towards Erfurt, I was joined by an elderly man, whom I supposed, from his appearance, to be some respectable citizen. We had not been long together before the conversation turned upon Goethe. On my asking whether he knew Goethe—'Do I know him?' said he with vivacity; 'I was his valet almost twenty years!' I begged to hear something of Goethe's youth, and he gladly consented to gratify me.

"'When I first lived with him,' said he, 'he was very active in his habits, thin and elegant in his person. I could easily have carried him in my arms.'

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great epidemics were naturally preceded or attended by disturbances both of the earth and the sky. We may observe, in passing, that the Egyptian magicians who withstood Moses, were evidently believers in their own power to effect all he did. Egypt is still the land of magic; and to this day the traveller sees many strange sights which he can neither explain nor discredit. If some of these find their explanation in mesmeric phenomena, we may well believe that the subject of this mysterious influence is always strongly acted upon by the powers of the air.

I asked whether Goethe, in that early part of his life here, was disposed to gaiety. 'Certainly,' he replied, 'always gay with the gay, but never when they passed a certain limit; in that case, he became grave. Always working and seeking; his mind always bent on art and science; that was the way with my master. The Duke often visited him in the evening; and staid so late, conversing on literary topics, that I would get extremely tired, and long to have the Duke go away. One time he rang for me in the middle of the night. When I came up, I found he had rolled his iron trundle-bed to the window, and was lying there looking out upon the heavens. 'Have you seen nothing remarkable in the heavens?' asked he; and when I answered in the negative, bid me run to ask the same question of the watchman. He said he had not seen anything remarkable. When I returned with this answer to my master, I found him in the same position in which I had left him—lying in his bed, and gazing upon the sky. 'Listen,' said he to me, 'this is an important moment; there is now an earthquake, or one is just going to take place;' then he made me sit down on the bed, and showed me by what signs he knew this.

"I asked the good old man what sort of weather it was.

"'A cloudy night,' he replied, 'no air stirring; very still and sultry.' I asked if he believed there was an earthquake merely on Goethe's word?

"'Yes,' said he, 'I believed it, for I always found things happened as he said they would. Next day, while he was relating his observations at Court, a lady whispered to her neighbour, 'What visions are these of Goethe's?' But the Duke, and all the men present believed Goethe; and the correctness of his observations was confirmed in a few weeks, by the news that a part of Messina was on that night ruined by an earthquake."—Eckermann's "Conversations with Goethe in the Last Years of his Life." Translated by S. M. Fuller. Pp. 64-66. Boston, 1839.

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ON EPIDEMIC CHOLERA.

CHAPTER I.

ITS MARCH.

India and some parts of China seem to have been the birthplace and home of cholera from the earliest ages; but until 1817, we cannot affirm with certainty that it ever assumed an epidemic character, or spread over other parts of the world. It has indeed been supposed that the plague which consumed the Israelites in David's time was this disease, and the following description quoted from Josephus by Christie may perhaps justify the inference:—"The prophet had no sooner received and reported David's answers, but the Israelites were seized with a most unaccountable distemper, that was still attended with certain death, and accompanied with accidents that baffled all the doctors either to find a remedy or reason; but they died, in short, one upon the neck of another, no one knew how. *Some went off with gripes and torments that despatched them in a trice; some with incurable faintness and languors, in despite of the physicians; others with vertigo, dimness of sight, suffocations,*

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&c. The mortality was so great, in fine, that between break of day and dinner-time there were swept away by this pestilence seventy thousand persons.*

It is said to have ravaged Europe in 1600; and Ozanam gives the following quotation from Zacutus de Lisbonne,—"Anno 1600, quando hæc pestifera lues Europam fere totam oppresserat, observavi plures qui hoc diro dolore affecti venenosis symptomatibus excruciati, occubuêre omnes; nullus quartum diem pertransit. * * *

"Materia semicruda cum ichoribus multis ubertim qui per alvum et vomitum protrudit et multoties in tantâ copiâ ut ob exhaustum spiritum superveniant syncope, animi deliquia, virium jactura, pulsus ablati, intensissima sitis, convulsio, rigor, nervorum retractiones, aphonia, stupor, caligo oculorum, extremorum frigiditas, anxietas, angor, facies hippocratica et mors." (De Prax. Admirand. lib. ii. obs. 23 and xv.)

But at best these are but dim notices—more interesting to the antiquarian than to the practitioner; and we pass to clearer descriptions by writers of the present day.

In casting one's eye upon the map of India, it is impossible not to be struck with the watering of the great plain of the Ganges. Not only does the main trunk ramify on both sides as we track it upward towards its source, but instead of debouching by one large outlet, like rivers confined by barriers as in our own country, it splits into many fingers, as it were—each of which finds its own separate entrance into the sea. There are few plains in the world watered like the Delta of the Ganges. Here it was that in the summer and autumn of 1817, cholera burst out in various places simultaneously, destroying six thousand of the inhabitants of the town of Jessore, about eighty miles north-east from Cal-

* The works of Flavius Josephus, by Sir Thomas l'Estrange. London, 1702.

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cutta; and in a few weeks stretching from Sylhet on the east, to the extreme borders of Balasore and Cuttack, and reaching from the mouths of the Ganges, nearly as high as its junction with the Jumna. At this period, within an area of several thousand miles, scarcely a town or village escaped; and so great was the mortality, that the bulk of the whole population was sensibly diminished. The large and populous city of Moorshedabad, however, situated in the heart of the conflagration, almost entirely escaped. It hardly crossed the Ganges—appearing on the eastern side like an exotic, which soon dies out.

Towards the end of autumn, instead of bursting out over the country as it had done, it began to travel in a given direction, and to confine itself within certain geographical boundaries; and in its march, it encountered, for the first time, in the beginning of November 1817, the centre division of the British army, under the command of the Marquis of Hastings, near the banks of the Sinde: "It was here," says Mr. Jamieson, in the 'Bengal Report,' "that the disease first put forth all its strength, and assumed its most deadly and appalling form. It is uncertain whether it made its approaches on the 6th, the 7th, or the 8th of the month. After creeping about, however, in its wonted insidious manner for several days among the lower class of the camp-followers, it as it were in an instant gained fresh vigour, and at once burst forth with irresistible violence in every direction. Unsubjected to the laws of contact and proximity of situation, which had been observed to mark and retard the course of other pestilences, it surpassed the plague in the width of its range, and outstripped the most fatal diseases hitherto known in the destructive rapidity of its progress. Previously to the 14th, it had overspread every part of the camp, sparing neither sex nor age in the undistinguishing

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virulence of its attacks: the old and the young, the European and the native, fighting-men and camp-followers, were alike subject to its visits, and all equally sunk in a few hours under its powerful grasp. From the 14th to the 20th or 22d, the mortality had become so general as to depress the stoutest spirits; the sick were already so numerous, and still pouring in so quickly from every quarter, that the medical men were no longer able to minister to their necessities. The whole camp then put on the appearance of an hospital. The noise and bustle, almost inseparable from the intercourse of large bodies of people, had nearly subsided; nothing was to be seen but individuals anxiously hurrying from one division of the camp to another to inquire after the fate of their dead or dying companions, and melancholy groups of natives, bearing biers of their departed relatives to the river. At length even this consolation was denied them; for the mortality latterly became so great that there was neither time nor hands to carry off the bodies, which were then thrown into the ravines, or hastily committed to the earth in the sheets in which they had expired, and even round the walls of the officers' tents. All business had given way to solicitude for the suffering. Not a smile could be discovered, not a sound heard, except the groans of the dying, and the wailing over the dead. Throughout the night especially a gloomy silence, interrupted only by the well-known dreadful sounds of poor wretches labouring under the distinguishing symptoms of the disease, universally prevailed. The natives, thinking that their only safety lay in flight, had now begun to desert in great numbers, and the highways and fields, for many miles round, were strewed with the bodies of those who had left the camp with the disease upon them, and speedily sunk under its exhausting effects." The army was moved on the 13th; and on the 19th encamped

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on high and dry ground at Erich, where the pestilence soon entirely disappeared. The whole line of march presented a most deplorable spectacle; hundreds dropped down on the road, which looked like a field of battle, or the track of a defeated army. "The exact amount of mortality during these few calamitous days could not, from the circumstances of confusion and general disorder under which it took place, be ascertained with any degree of accuracy. From the military returns, however, it appears that in this fatal week, of 11,500 fighting men of all descriptions, 764 fell victims to the disorder; and of the camp-followers, it was conjectured that 8000, or one-tenth of the whole, were cut off."

This great mortality in our army naturally reminds one of the still more terrible destruction that overtook the Assyrians in the time of King Hezekiah. "And it came to pass that night, that the angel of the Lord went out and smote in the camp of the Assyrians an hundred and fourscore and five thousand; and when they arose early in the morning, behold they were all dead corpses." (2 Kings xix. 35.)

In the year 1818, the cholera advanced in a westerly direction as far as Kotah, a town situated on the eastern side of a range of high hills, which, as will be seen by casting a glance at the map, form the western boundary of the basin of the Ganges. Here it stopped; and there were no cases in Odneypoor or Ajmeer, which are the first considerable towns on the other side of the mountain range. The inhabitants of the country on this side congratulated themselves on having escaped the enemy, which had taken full possession of the whole of the valley beyond their rocky barrier. Their security was short-lived; for in July 1819, they were dismayed by the intelligence that their Prince had been attacked by

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the disease in his palace, and his Prime Minister had died of it after a few hours' illness.

"Pallida mors æquo pulsat pede pauperum tabernas
Regumque turres."

It soon spread among the inhabitants of the town, where it committed dreadful havoc.

Before sketching its course through other parts of India, let us observe that after overrunning the district of country to the east of the hills as we have described, it halted for about eight or nine months, without the interposition of any *cordon sanitaire*—during all these nine months there was no impediment to the intercourse of the inhabitants. They went and came as heretofore, but the cholera remained. *It did not cross with the stream of human activity, but bided its time.*

In March 1818, it first appeared in Allahabad, situated at the junction of the Ganges and the Jumna, and swept off about 10,000 of its inhabitants; and a curious fact is, that the troops, though mixing freely with the townspeople, were not affected until the middle of the following July. Keeping close to the banks of the Ganges, it entered Cawnpore on the 8th of April. Passing over several intermediate towns, it attacked Shahanpoor in July, and destroyed 5000 of its inhabitants.

It extended up the river Jumna in the same way, desolating some places, while it spared others. It appeared in Matra as early as the beginning of June, while Agra, situated lower down, was not attacked till July. Agra is a dry, airy town, and it suffered little; Matra is filthy and crowded, and it suffered much. We may observe the principle of local election now coming into play. It committed great havoc at Delhi in July and August, and in Saharanpore in Septem-

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ber and October. Here it again encountered another edge of the basin, and could not be traced over the mountains.

The Medical Board of Bengal, in a letter to that of Bombay, observes:—"The disease would sometimes take a complete circle round a village, and leaving it untouched, pass on, as if it were about wholly to depart from the district. Then after the lapse of some weeks or even months, it would suddenly return, and scarcely reappearing in the parts which had already undergone its ravages, would nearly depopulate the spot that had so lately congratulated itself upon its escape. Sometimes after running a long course on one side of the Ganges, it would, as if arrested by some unknown agent, at once stop; and taking a rapid sweep across the river, lay all waste on the opposite bank. It rarely, however, failed to return to the part which it had previously left. After leaving a district or town, it sometimes revisited it; but in such cases, the second attacks were milder, and more readily subdued by medicine than those in the primary visitation." The disease occurred in all seasons and weather, but changeable, damp weather seemed to favour it, and its progress was frequently arrested by a thunderstorm. Low, damp places were most liable to be attacked, and in such localities it has remained ever since its first appearance; so that there are places such as Gooty, through which if troops be marched, they are almost certain to suffer from the disease.

As our object is not to write a history of the diffusion of the cholera, but merely to narrate such facts as seem to us to cast a light upon the law of its progress over the world, we do not intend to follow its course farther in India, or to the East generally. Suffice it to say, that by January 1819, it had spread over the whole of the Indian peninsula; and by 1820, it had added Siam and Malay to its dark do-

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minions. It occupied those countries, as it were, by prescriptive right; for in China, and over all India, it had long been at home as a sporadic disease. It was nothing new there, except in degree. Not so, however, as we trace its march to the West. Here it entered countries where it had never been seen before, and brought before the eyes of the inhabitants of Europe forms of death until then known only by tradition.

We left the cholera in 1819 at the western borders of Hindostan; it took two years to cross the intervening district between that and the other great eastern valley of the river Euphrates. In the summer of 1821, it raged with great violence on both sides of the Persian Gulf. At the town of Bussorah alone, it is said to have destroyed 14,000 people in fifteen days—nearly 1000 a-day! In September, it got as far as Shiraz, and committed great havoc; 6000, out of a population of 40,000, having died of it. Bagdad was attacked about the same time. Again it went into winter quarters, to resume its campaign the following summer of 1822. At this time the Prince of Persia, Abbas Mirza, was carrying on war against the Turks, on the high table-land near the source of the Euphrates, when both armies were attacked by this invisible foe, which proved more deadly than their mutual hate. Mr. Baillie Fraser gives the following account:—"The Prince pursued his success as far as the pass of Deear, about three days' march from Topra Kullali, when the epidemic cholera, which had appeared in his camp even previous to the action, now broke out violently, and he thought fit to commence a retrograde movement to Khooe. From that moment, the Persian army also appears to have been virtually dissolved. The men dropped off rapidly; and whole troops deserted to return to their homes; so that when he reached Khooe, he had scarcely any army to dismiss. The loss by disease was

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estimated at about one-tenth of the whole force; although in some batallions 300 died out of 1000 men; and the rear of their line of march was strewn with dead bodies, as if it had been all the way in action!"—almost the words used to describe the condition of the British army, under the Marquis of Hastings, in similar circumstances. The description of the disease at Tabreez, by the same writer, is interesting:—"It is difficult to say how or whence the epidemic cholera, that scourge of the East, reached Tabreez. It was supposed to have come from Bagdad, along the caravan road by Hamadan and Sennar; but no accounts to be at all depended on could be obtained of its gradual progress. A whisper had gone forth that the disease had appeared in the town, as early as the 17th of July, but a week made it no longer doubtful; and upon our return to Tabreez on the 24th, after a short absence, we understood that from fifteen to twenty were daily dying of cholera.

"During the next ten days, the state of the distemper varied greatly; sometimes the fatal appearance diminished so much that it was doubted whether the alarm were not a false one. The sick were attacked with vertigo and sickness, which was attributed to the fearful effect of the sun's rays; and though some died, yet some recovered without having evinced many of these more peculiar and alarming symptoms which generally mark the disease." It is interesting to notice that, *there* as *here*, there was a premonitory morbid condition, indicating the approach of disease, and probably predisposing to it: but quite a different one. We direct attention to this now, as we shall have occasion to revert to the fact afterwards. To continue our description:—"By degrees, however, these symptoms disappeared; violent vomiting, accompanied with painful cramps, damp, clammy sweat, cold and bloodless extremities, burning heat

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at stomach, a sudden death-like countenance, cessation of all the pulses: these, and other striking characteristics of this fearful disease, marked the fatal cases, and terminated in death.

"Often when the disease was at its height, the first seizure, indicated by vertigo, proved fatal at once. Several instances came to our knowledge of persons thus attacked in the streets, who fell down senseless, and never recovered."*

About the same time that the cholera raged along the shores of the Persian Gulf, it appeared at Mecca, Medina, Damascus, and Aleppo, having spread over a great part of Arabia. Its rapid progress across the desert is of remarkable interest. It takes months or even years to get over a mountain range, traversed by thousands of people with all their merchandise, and it crosses the great Arabian desert, where a human being is seldom seen, and all is death and stillness, in a space of time unappreciable from its shortness.

The eastern shores of the Mediterranean Sea, and the western shores of the Caspian, formed the extreme limits of its progress in 1823; and it then subsided entirely, and as it was hoped for ever. Nothing now was known of it for six years, so that it was not till 1829 that it suddenly broke out with its former violence in various parts of Persia. Again it subsided entirely during the winter months, but only to revive with great malignancy in the spring of 1830.

It broke out on the western shore of the Caspian Sea in June 1830, and committed great devastation in Georgia, confining itself chiefly to the towns situated along the valley of the river Kur, and extending by the beginning of August from Saliany, which is at the mouth of that river, to Tiflis, which is near the source. In this latter town, 238 persons died of it in six days, and the authorities gave the inhabi-

* Travels of Mr. Baillie Fraser, p. 316.

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tants permission to take refuge in the Caucasian mountains, at the base of which Tiflis stands. We do not hear of it ravaging the country between the Caucasus and the Volga. The chain of mountains seem to have been an effectual barrier to its progress as they have often proved to the advance of the Russians from another quarter.

Instead of attempting to force the Caucasian passes, it crept along the shores of the Caspian to Astrachan, at the mouth of the Volga, where it arrived on the 1st of August, and numbered nearly a hundred victims a-day. It also extended along the rivers Terek and Kuma into the province of the Caucasians.*

By the 21st of the same month, it had got as far as Saratoff, still following the course of the river, and therefore advancing for a considerable distance in a *north-easterly* direction. Here it was very deadly, having within a month destroyed 2367 individuals.

Matters now began to look serious in Russia. The enemy had got into the country, and seemed disposed to march up the valley of the Volga; and if it did so, would soon arrive at the old capital of the Muscovite empire, Moscow, which was not prepared to re-enact the scene by which it had dislodged Napoleon. The Emperor of Russia seeing the alarming prospect, adopted those stringent measures for defence which his absolute authority enabled him to put in execution, in order to secure his great southern metropolis. Moscow, distant 1402 verstes from Astrachan, is situated on a table-land about 587 feet (French measure) above the level of the sea. On two sides of the town there run two rivers, which are connected by a canal, so as to form a triangular

* See "A Treatise on the Epidemic Cholera, containing its history, symptoms, autopsy, etiology, causes, and treatment," by Alexander Turnbull Christie, M.D., London.

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island ; this low-lying triangle embraces the larger part of the habitations of the poorer population, which consisted then of about 300,000 inhabitants. The city is surrounded by fortifications and barriers, so that access or exit is entirely under the control of the commandant, who has always a very large garrison to enforce his regulations. The first case occurred on the 14th of September, and the patient resided in the low triangle we have just mentioned. The man died on the 17th. On the same day, a soldier in the barracks, situated near this ground, took ill of symptoms resembling cholera ; and likewise *a nun in a convent*, situated at some height above this piece of ground, was seized with the disease, and died on the 19th. Upon the 18th, a student attending the University was suddenly taken ill, and died in nine hours.

On the 18th of September, a *cordon sanitaire* was formed all around Moscow, and the most stringent measures were adopted to prevent the ingress of any persons or articles of merchandise from an infected district, until they had been subjected to a quarantine of fourteen days and the necessary purification ; and as some cases had already occurred in the town itself, an order came out appointing a sanitary commission—dividing the town into districts, over each of which there was a "chef de quartier." Great powers were given to this commission, and a large sum of money was put at their disposal. They had orders to inspect, by means of proper officers, all the houses of the inhabitants, to establish hospitals wherever they thought fit, and generally to adopt such measures as were deemed advisable to arrest the progress of the incipient plague. We have no doubt that they did their duty ; for a despotic power, such as Russia, enforces attention to its regulations in a very effective style. However, notwithstanding all these precautions, within seventeen

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days the disease had developed itself in all the arrondissemens; 459 had been seized, and 178 had died. Towards the end of September, the disease was at its height, and nothing but despair was depicted on every face. It was on the 29th of the month, that, with a devotion which we must all admire, at a time when it was universally believed that the disease was highly contagious, and when all intercourse between the infected parts of his empire was cut off, lest his subjects should perish, the Emperor Nicholas himself came to Moscow to calm the alarm and raise the spirits of its inhabitants, and remained there till the 7th of October. This certainly is one of the most memorable royal journeys on record.

In the month of October, there were 5532 cases, of which 3107 were fatal; and among these were many persons of the highest class. In November, it began to decline, and continued to do so in December, when it seemed to pass into a kind of general influenza; and rheumatic affections, which are common at that season, began to prevail. The cholera abated steadily till March 1831, when it ceased entirely for a time, to break out again in the following summer.

On its first approach a manufacturer, who had fifty persons in his establishment, lost four by the disease; he immediately removed the rest to a house in a higher situation, and from that time, there was no other case.

The small town of Tcherkisowo, situated close to Moscow, and holding communication with it when the cholera was raging, was not attacked by it till the month of November. Thus it had lasted six weeks at Moscow, and committed dreadful havoc there before a single case occurred in this place, which lay at the very door.*

* Rapport sur le Cholera Morbus de Moscou, par F. C. M. Markus, Secrétaire du Conseil temporaire de Médicine, &c. &c. Moscou, 1832.

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The total number of cases in Moscow was 6305, of which 3533 were fatal. The daily seizures at one time were about fifty, and the deaths about half that number. About the same time that it had reached Moscow by one route, it reached Odessa by another; but generally declined in the southern provinces of Russia, where it had shown itself during the winter of 1830. Having established itself on the borders of the Black Sea and Sea of Azof, it began to ascend the Danube in the winter of 1831, and appeared at Jassi on the 10th of May. By August it was in Vienna. While one division was thus penetrating into Europe by the south, another column, having set all the barricades of the Emperor Nicholas at defiance, forcing its way in a westerly direction, spread towards St. Petersburg in the north, and over the Carpathian Mountains into Transylvania, and Hungary, and Poland towards the south. It attacked the towns of Brody and Cracow during that summer, and spread generally over Galicia. In Hungary, it was computed that about 19,000 persons fell sick, of whom 8266 died. We cannot trace its progress minutely from place to place throughout the extensive plains of Poland: it seems to have spread over them as the hordes of barbarians in a former age may have done, following no geographical lines, but occupying all the thickly peopled districts.

Advancing to the north, it arrived at St. Petersburg on the 25th of June; and here it changed its course, and went down the Gulf of Finland in a south-easterly direction. It entered Prussia by way of Castrin, Riga, Posen, and Stettin, and occupied Berlin on the 31st of August 1831; and about the beginning of October, it made its appearance in Sunderland.* It made very little way in England during

* Clanny on the Cholera of Sunderland.

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that year, and had entirely subsided by the 2d of January 1832.

Having traced the cholera thus far to its invasion of our own island, we shall not follow it any further in Britain, but return to the Continent of Europe.

It broke out in Paris upon the 27th of March 1831, and from that date to the beginning of August it had attacked 26,300 persons. The total number of persons attacked in France, where it spread generally in 1833, destroying the fish and the fowls as well as the human race, was estimated at 229,534 individuals, of whom 94,626 died.

It did not reach Marseilles and Toulon till 1835.*

We have now with considerable minuteness traced the march of the cholera from the banks of the Ganges to the shores of the North Sea; and before offering any general reflections upon the facts we have brought together, we shall advert to the course of the epidemic on its recent occurrence; and we shall do this very shortly, for it would serve no purpose to go over exactly the same ground we have just quitted. In the words of a writer in the British and Foreign Medical Review for January 1849:—

"The disease always followed frequented routes and water-courses on which navigation was active, equally in 1847 as in 1830. The governments which were most exempt in 1830-31 were this time also less severely attacked.

"In the winter, the cholera lessened or disappeared; it reappeared with the first warmth of spring. In all these particulars the cholera of 1847 has manifested a singular conformity with the laws which seemed to govern it in 1830. In comparing the dates of attack in different governments, in the two epidemics, some very striking analogies are discovered. The following table of the principal cities of the govern-

* Ozanam, Op. Cit., p. 264.

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ments, and of the dates of attack in 1830 and 1847, is given by M. Lasègue :—

	WHEN ATTACKED.	
	1830.	1847.
Tiflis	July 1st	May 5th.
Kislar	Middle of July	End of May.
Astrachan	July 31st	June 21st.
Zaritzyn	August 13th	Middle of August.
Saratoff	August 20th	August 25th.
Zimbirsk	September 8th	September 15th.
Kazan	October 4th	September 17th.
Georgiew	End of July	End of June.
Stawopol	September 6th	July 16th.
Novo-Tscherhask	September 10th	July 13th.
Taganrok	October 8th	August 15th.
Kiew	January 8th	October 5th.
Mohilew	End of January	October 18th.
Karkhoff	September 23d	August 23d.
Woronesch	End of September	September 5th.

"Too much stress must not be laid upon these coincidences, curious as some of them undoubtedly are. Moreover, we find important exceptions. Odessa and Orenburg, also, both suffered at periods differing from each other, in the two epidemics.

"In the further progress, there are also some singular coincidences. Thus cholera appeared at Moscow in the beginning of October 1830; at the end of September 1847. It appeared at St. Petersburg on the 25th of June 1831; and in the beginning of June 1848. The first cases occurred in Berlin on the 31st of August 1831; about the 12th of August 1848. In our own country the coincidence has failed, for cases of cholera have already occurred in places situated in all parts of the kingdom, from Edinburgh to Plymouth, within a short space of time."

Having tracked this deadly visitant round half the globe, we naturally come to inquire by what force it has been impelled, and by what conditions it has been limited or directed.

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We may be able to arrive only at negative conclusions on this subject, but that is always nearer the truth than positive error.

Did it advance from India hither by contagion? Let us first look narrowly at the meaning of the affirmative answer to this. Supposing one person has a disease, and another person, previously well, touches him, and takes the same disease, and in his turn, comes in contact with another, and another, and another, and they all take it, and in their turn give it to all they meet—then that disease is spreading by contagion. In doing so, it will tend to spread in circles, like ripples from a stone thrown into the water, augmenting as they retire from the original centre of disturbing force. The circular form will be retained as long as there is surface enough of water to afford room for a complete circle, and when it comes in contact with a bank, then the waves will be in segments of circles. They never can lose altogether their tendency to a circular character. The same is the case with a disease which advances by contagion alone. It should spread in ripples among the population where it first appeared, and gradually enlarge the circumference of its sphere until it had embraced all who were susceptible of its influence. The only determining condition would be the density of the population; it should spread more rapidly in a dense than a sparse community. It never could spread at all where there were no people, any more than a fire could spread without fuel. It would always be found along the line of human intercourse, and nowhere else. It would go from place to place with men—whether they went by ships, by canals, by railway, or go how they would, if it spread by human contact, they could no more get rid of it than can a villain get rid of his guilty conscience by change of place. It would attend man like his shadow. Such are the obvious

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conditions of a disease which owes its power of advancing to contagion. Let us try whether they suit the cholera.

The overland mail from India takes about six weeks to reach this country. The cholera took thirteen years. It would hardly have suited Sir Charles Napier to have been so long on the road.

When it first broke out in Hindostan, it spread like fire over a dry prairie, but did not cross the Ganges. We have no means of knowing how many thousands crossed that river and travelled east during the time the plague was ravaging the plains of the west. The numbers must have been immense; they went from the cholera—they did not take it with them. It ran up the Ganges and up the Jumna; it missed some towns and assailed others; there was no barrier to the intercourse between the places where it raged and those which were exempt, and yet it did not spread laterally—it kept in a given direction. It attacked the British army, and thousands died. The army decamped with the disease in its bosom, and when it had removed to a little distance from its former location, the disease subsided. When it got to the hills west of the basin of the Ganges, it stopped for the winter; during all that time, men, women, and children were pursuing their pilgrimage to the west, and yet it went not. When it had stopped the operations of the Persian army at the sources of the Euphrates, the disbanded army, many of whom were sick of it, did not diffuse it in the country they occupied. It crossed the Desert, where the Israelites wandered for forty years, like a flash of lightning —appearing simultaneously on its east and west border. It continued, notwithstanding the Emperor's stringent measures, as regardless of them as was the sea of the satyrical interdict of Canute, to advance step by step over his broad dominions, sometimes creeping slowly up a river, and sometimes

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traversing the wide plains swifter than the fleet Cossacks, who are their only inhabitants. It convinced those who had most to do with it, that it was altogether in vain to attempt to arrest its progress by quarantine measures.* Seven hundred and sixty vessels arrived from places where cholera was raging, at different ports of Britain, and not a case occurred on board the vessels, or at the quarantine stations outside the Categat Sea.† It did not go where men were thickest; it went fastest where there were no men. It therefore did not advance by contagion. We do not say that it is not contagious; on the contrary, we intend to reserve the discussion of that for the next Chapter; but we say that the hypothesis of its contagiousness never could be made to account for its course from India to this country.

The few conditions of its progress that we have become acquainted with are the following:—It has a decided affinity for water. By casting a glance at the map which accompanies this volume, this will be recognised at once. It has a strong tendency to run up rivers, even to their very source. It frequently declines in winter, to revive with the approach of summer. It is most fatal in large, low-lying towns. It passes rapidly over plains; it finds difficulty in getting over hills. It has hitherto confined itself to certain parallels of latitude. Its progress is generally most rapid in autumn, and its course is in a westerly direction.

These are nearly all the unquestionable facts taught us by its two successive invasions of Europe.

The next question we come to discuss is a most obscure one. It is this. Since contagion fails to account for the progress of cholera all round the world, by what force is it

* See the Report of the Moscow Board of Health.

† Documents transmitted by the Central Board of Health to the Privy Council, 1832.

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impelled? To this we shall not venture any answer, but throw out the few suggestions which have occurred to us in the course of our reading and meditation upon the subject.

There is something very dreadful in the idea of an infected atmosphere. Against poison in other forms we can guard. We can analyze our food, and even for a time abstain from eating. But we must breathe or die; and it is a frightful alternative to know that if we do breathe, we must also die. Yet so it is. The viewless, scentless, impalpable air, the breath of life, is sometimes charged with a poison so powerful that no organism can withstand its baneful influence, and yet so subtle that no chemistry can detect its presence. No wonder that when this is known to be the case, a most anxious investigation of all atmospheric phenomena should be made, and everything which was supposed to be unusual about these, should be associated with the taint which affected the air. As yet we might report upon this department of the subject in the words of Lord Bacon:—"Spe fallente, progressu haud prospero, fructu parco et exiguo, cum contemnendo aut plane nullo successu."

This much is certain, that there must be "something in the air" when the cholera rages. It is *in the air*, for it affects the aerial inhabitants. When the cholera came to Petersburg, the crows forsook their old roosting-places, and the swallows their nests, and disappeared altogether during the time it was there.* Yet it was not *of the air*, for it has been observed not to be affected by wind; and indeed in

* Einige Bemerkungen über die Asiatische Cholera, für Ærzte, nach eigener Erfahrung gesammelt auf einer zur Beobachtung des übels unternommenen Reise, von C. Müller, Dr. Med. Hannover, September 1848. Also, Observations on the Asiatic Cholera, by Adair Crawford, Esq., M.D., Metropolitan Sanitary Commission. As we shall have occasion to refer to these pamphlets again, we may here observe, that Dr. Müller was sent by the Hanoverian, and Dr. Crawford by our own Government, to investigate the cholera in Petersburg, and these are their "Reports."

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some places, as Russia, it seemed to prefer moving always against the wind.

Although in the present state of meteorology, when we cannot even predict whether the morrow will be wet or dry, hot or cold, it would be absurd to expect anything approaching to a scientific reply to the question which every one puts, —What is it in the air which causes this or any other fatal epidemic? yet a few positive observations have been made which seem to establish as a fact, that during the prevalence of cholera, there often is *a* disturbance of the ordinary atmospheric phenomena. We shall select a few examples of such observations; and as the reports about weather are generally framed in a very loose style, lest we should make bad worse by giving an incorrect account of these reports, we shall employ the words of the observers themselves. Our first authority is Dr. Prout :—

"The matters occasionally diffused through the atmosphere, which appear to be *in a state of solution*, are not often perceptible by our senses, unless in some cases, perhaps, by the sense of smell.

"As an instance of the presence of such bodies in the atmosphere, we may mention a very remarkable observation which occurred to the writer of this treatise during the late prevalence of epidemic cholera. He had for some years been occupied in investigations regarding the atmosphere; and for more than six weeks previously to the appearance of cholera in London, had almost every day been engaged in endeavouring to determine, with the utmost possible accuracy, the weight of a given quantity of air, under precisely the same circumstances of temperature and of pressure. On a particular day, the 9th of February 1832, the weight of the air suddenly appeared to rise above the usual standard. As the rise was at the time supposed to be the result

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of some accidental error, or of some derangement in the apparatus employed, in order to discover its cause, the succeeding observations were made with the most rigid scrutiny; but no error or derangement whatever could be detected. On the days immediately following, the weight of the air still continued above the standard, though not quite so high as on the 9th of February, when the change was first noticed. The air retained its augmented weight during the whole time these experiments were carried on, namely, about six weeks longer. The increase of the weight of the air observed in these experiments was small; but still decided and real. The method of conducting the experiments was such as not to allow of an error, at least to an amount so great as the additional weight, without the cause of that error, having become apparent. There seems, therefore, to be only one mode of rationally explaining this increased weight of the air at London in February 1832, which is, by admitting the diffusion of some gaseous body through the air of this city, considerably heavier than the air it displaced. About the 9th of February, the wind in London, which had previously been west, veered round to the east, and remained pretty steadily in that quarter till the end of the month. Now, precisely on the change of the wind, the first cases of epidemic cholera were reported in London; and from that time the disease continued to spread. That the epidemic cholera was the effect of the peculiar condition of the atmosphere, is more perhaps than can be safely maintained; but reasons which have been advanced elsewhere, lead the writer of this treatise to believe that the virulent disease, termed Cholera, was owing to the same matter that produced the additional weight of the air."

Dr. Clanny, "Medical Member of the Board of Health" at London, writes in 1831:—"We had several severe thunder-

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storms, and consequently sudden changes of the weather, in the months of September, October, and November. The commencement of the epidemic cholera was, according to my personal observation, about the beginning of the month of October; and I find in my memoranda of cases, that on the night between the 2d and 3d of November, much lightning occurred; and it is worthy of remark, that exactly at this time, our first five fatal cases were drawn up and reported to the Board of Health at London. Upon the 2d of November, we had no new cases; nor upon the 3d, 4th, and 5th; but upon the 6th, we reported six new cases, and two deaths; and upon the night between the 6th and the 7th, we had continued flashes of lightning during the whole night —an unusual phenomenon at this season of the year."*

"Unnatural times do breed unnatural troubles."

Dr. Müller, speaking of St. Petersburg during the present epidemic, observes:†—"The air, during the whole time of the presence of the cholera here, was oppressive, heavy, and very changeful in its degrees of temperature. There were frequent thunderstorms, but they had no influence in making people ill or restoring them to health. [A bold assertion!] Rain fell almost daily. The sky was gloomy—very misty in the evening; the sun seldom broke through. The depressing influence, (die muthlose Stimmung,) the peculiar constitution of the atmosphere acted, more or less, upon every one; almost without exception, all experienced a certain

* Hyperanthraxis, or the Cholera of Sunderland, by W. Reid Clanny, M.D., F.R.S.E., M.R.S.A., Physician to H. R. H. the Duke of Sussex, &c. &c. We give some of his titles to show that he is a man of learning and standing; for at first sight it seems odd to invent a special Greek name for the "Cholera of Sunderland." It would be a curious Babel-language, if every town where the cholera appeared returned a Greek member of the medical *parlement* (to adopt the old spelling).

† Op. Cit., p. 5.

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feeling of discomfort, weariness, pressure at the pit of the stomach, and tearing pains on the lower limbs." Our last quotation shall be from Dr. Crawford's Report, p. 5 :—

"STATE OF THE WEATHER IN RUSSIA IN 1848.

"The last winter in Russia was dry, moderately cold, and the fall of snow much less than is usual. The spring set in very early, the Neva being clear of ice, and the navigation open nearly a month sooner than is generally the case. The weather was fine and dry, and the temperature mild, in March, April, and the beginning of May. There was a great prevalence of severe influenza, complicated with sore throat, in February and March ; and in April and May, the number of cases of intermittent fever, and also of diarrhœa and dysentery (complaints generally prevalent at that season), was greater in the hospitals than in ordinary times. During the latter end of May and the whole of June, a remarkable change took place in the weather. There were almost constant high winds, shifting frequently and suddenly round to every point of the compass, and often accompanied with torrents of rain, and sometimes thunder. This disturbed state of the atmosphere was indicated by sudden fallings and risings of the barometer, sometimes to the extent of between one and two inches. The changes of temperature were equally frequent and rapid ; the heat being, for several days together, very great, as high as from 84° to 90° of Fahrenheit, and the air extremely sultry and oppressive, with a damp relaxing south wind ; and then suddenly, on a change of wind, and sometimes on the occurrence of a thunderstorm, this oppressive heat would be succeeded by great cold, the thermometer falling as much as 50° in a few hours, so that it was several times in June nearly as low as the freezing point.

"Another peculiarity in the condition of the air was the

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disturbed state of its electricity. This was clearly demonstrated by the fact, that the electric machines could not be charged, and to a great extent lost their power, as generally happens whenever the atmosphere is damp and unsettled. The same remark was made respecting the strength of several large magnets; and it has been reported since I left St. Petersburg, that the weather having become more settled, the electric machines and magnets have recovered their power. This disturbed condition of the electricity of the air was also indicated by the peculiarly depressed and uneasy state of feeling which almost everybody complained of more or less; some entirely losing their sleep, whilst others slept more heavily than usual. Few persons, in fact, during that period, escaped suffering from some degree of derangement in their health."

Dr. Crawford's last observation in regard to the electric phenomena is very interesting, for to this point we naturally turn for some light upon the mysterious influences which pervade the atmosphere during the prevalence of any deadly distemper. We find that thunderstorms have frequently been observed to attend epidemics; we know that our frames are powerfully affected by the electric condition of the air; and further, while the positive electricity decreases from sunset, and reaches its lowest point between sunset and sunrise, it has been observed that persons are generally seized with cholera in the night-time.*

The intimate relation of electricity to magnetism in all its branches, naturally leads us to the researches of Reichenbach; and certainly it is a very curious fact, that sensitive persons, and they alone, should be affected by the current which is always in the line of the magnetic meridian. We

* Markus, op. cit., p. 104, who quotes Delanay's Memoirs in corroboration of this remark. Also Orton, and Scot, and many other observers.

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shall quote at some length the observations of Reichenbach upon this subject:—

"59. Having detected in crystals a force, which, although quite different from magnetism, yet exhibited a very marked analogy with it; and considering, on the other hand, that animal magnetism, although likewise different from ordinary magnetism, yet showed a similar analogy to it, he was led to inquire, whether he could discover any common properties in the phenomena of these two forces, and to what extent? And also, whether animal magnetism, like the crystalline force, might not be subject to physical laws? As crystallization seems to mark the transition from organic to inorganic nature, he ventured to hope, that by experiment he might discover a point of connection between animal magnetism and physics, or perhaps even obtain, for animal magnetism, that firm foundation in physics which had so long been sought for in vain.

"60. But to prepare the way, it appeared, above all things, necessary to ascertain the part which in all these phenomena is played by terrestrial magnetism. If a magnet or a crystal produces so decided an effect on sensitive persons, it is certain that the magnetism of the earth, which gives the needle its direction, cannot be without influence on the animal nerve. And thus it was obvious, that it would be impossible to obtain any pure result from any experiment as long as this powerful agent, which must act in some way, was not subject to measurement and calculation, with a view to its elimination. With this idea, trials were made with both healthy and diseased individuals, as M. Schuh, M. Schmidt, surgeons; Mdlles. Nowotny, Sturmann, Maix, Reichel, Atzmannsdörfer, and others, in different circumstances and at different times.

"61. M. Schuh had, in the house then inhabited by him,

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the singular custom, when he awoke early in the morning, of regularly turning himself in bed, so as to place his head where his feet had been; on doing this, he invariably fell asleep again, and this second sleep, contrary to the usual opinion, was to him far more refreshing than the whole sleep preceding it. If he omitted this, or lost his second sleep, he felt weary all day, and thus this strange custom had become a necessity for him. The author inquired, and found that the position of the bed was such, that the head of the sleeper, in his ordinary position, that is, the head of the bed, was directed to the south, the feet to the north. He advised the turning of the bed into exactly the opposite position, with the head toward the north; and from that time, the necessity for the second sleep never returned, the ordinary sleep was refreshing and sound, and the custom above mentioned at once given up.

"62. M. Schmidt had experienced, in travelling, a chill in the right arm, and had suffered for some time from violent rheumatism, with most painful cramps, from the shoulder to the fingers. He was treated by his physician with a magnet, which relieved the cramps, although they always returned. He lay then with his head to the south; on the position being reversed, so that he lay in the magnetic meridian with his head to the north, he immediately felt comfort and relief. Instead of shiverings, he now felt an agreeable uniform warmth, the passes with the magnet were now much more cooling and beneficial than before; and before the author left him, the stiffened arm and fingers were quite moveable, and the pain had disappeared.

"63. On examining the position of Mdlle. Nowotny, she was found lying almost exactly on the magnetic meridian, her head towards the north. She had instinctively chosen this direction, and it had been necessary to take down a stove to

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allow her bed to be placed as she desired it to be. She was requested, as an experiment, to lie down with her head to the south. It took several days to persuade her to do so, and she only consented in consideration of the weight which the author attached to the experiment. At last, one morning he found her in the desired position, which she had assumed very shortly before. She very soon began to complain of discomfort, she became restless, flushed, her pulse became more frequent and fuller, a rush of blood to the head increased the headach, and the sensation of nausea soon attacked the stomach. The bed with the patient was now turned, but was stopped half-way, when she lay in a magnetic parallel, with the head to the west. This position was far more disagreeable than the former; indeed, absolutely intolerable. This was at half-past eleven, A.M. She felt as if she would soon faint, and begged to be removed out of this position. This was done, and as soon as she was restored to the original position, with the head to the north, all disagreeable sensations diminished, and in a few minutes were so completely gone, that she was again cheerful. But besides these very disagreeable feelings which acted profoundly on her, in the altered position, all her sensations, in regard to external matters, were altered. For example, the streaking with a magnet, usually so agreeable, was now disagreeable; and if strong, intolerable; and, in short, all her relations to different substances took a new and very different form.

"All these experiments were at different times repeated, and with exactly the same results. She could hardly endure the position from west to east, or that from east to west, more than a minute, without feeling all the symptoms above described, with a tendency to syncope, and recovered instantly when the position was changed to that of north to south.

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"As she had long been affected with a gradually increasing illness, the author inquired if at any former period this sensibility to position had occurred; and it appeared that she had lived in different houses, and had suffered uneasiness in some, while in others she had felt comfortable, without the cause being known. Her brother was now told to take a compass and ascertain the position of her beds in the different houses, as well as of her couches and work-chairs. It was found that in one house her bed and couch had accidentally been almost exactly in the magnetic meridian, and that she had lain with her head towards north, not towards south. In another house she had lain in a line north-east and south-west. In fact, she had been comfortable in the former, while in the latter she had always suffered and struggled with illness. Even now, without knowing why, she could not bear to sit across her bed or sofa, neither could she lie on the sofa, but could only bear to lie in bed. In the first case her position was from west to east, in the second east to west, in the third south to north; only in the last could she obtain the indispensable position from north to south.

"Of all positions, the worst by far was that from west to east, that is, the head to the west.

"64. Mdlle. Sturmann, in consequence of violent dancing, 3 years before, was attacked by her illness. She now suffered from tubercles in the lungs, and was subject to cataleptic attacks. The author found her lying in the position from west to east. In this position, the great magnet (carrying eighty lb.) placed above her head or under her feet, had hardly any effect. She was then placed in the position from north to south. The change was instantaneous. The patient at once expressed a feeling of comfort, the previously existing restlessness ceased; a painful sensation of heat in the eyes, which had constantly annoyed her, disappeared,

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and in its stead she felt an agreeable coolness ; a universal relief obviously spread over her whole being. Then followed a night of singularly sound sleep, such as for a long time she had not had. Another time the position from south to north was tried, with an equally rapid change for the worse: general restlessness, flushing, oppression of the head, and burning sensation in the eyes, at once returned ; and all were, so to speak, as easily put an end to as soon as the patient again occupied the position from north to south. While she was in this, the normal position, the author again tried the magnet. But what a change ! At the distance of four paces from the head, he removed the armature of the magnet. The patient did not speak, and was found insensible and affected with tonic spasms. After her recovery, he again, at seven paces from her feet, removed the armature, and she had hardly spoken a word when she became speechless, and fell again into the same state. A third time he went, in the line of the magnetic meridian, as far as the ward permitted, upwards of thirty feet from her feet. When the armature was removed, she did not instantly feel anything, but after about a minute she ceased speaking at once, in the middle of a word which was actually on her tongue. She was suddenly seized, and was found lying in convulsions, with clenched hands, her eyes open and turned upwards ; so unconscious that he could lay his finger on the cornea without her moving the eyelids. What a difference of effect ! The same magnet which had been placed above her head and under her feet without any marked action, while she lay in the line of a magnetic parallel, now when she lay in the meridian, struck her down senseless at the distance of thirty feet.

"65. Mdlle. Maix, who was neither cataleptic nor somnambulist, gave similar results ; she could only endure the position from north to south, and that from west to east was of

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all the most intolerable. In her case, the experiment was tried in the afternoon, while with Mdlle. Nowotny, it was in the forenoon.

"66. Mdlle. Reichel also perceived a very marked difference: and as the author found her bed in the position from south to north, he recommended a change to that from north to south. From this change she derived much benefit, her rest being much improved.

"67. Mdlle. Atzmansdörfer, on two occasions, one in the morning, the other in the evening, could only bear the position from north to south, and found that from west to east the most disagreeable.

"68. All these patients now recollected how painful and disagreeable it had always been for them to remain in church, although they could never tell why. But as all Catholic churches are built from east to west, those in front of the altar are necessarily in the position from west to east, which to all sensitive persons is the most intolerable. In fact, these patients, in that position, had often fainted and been carried out of church. At a later period, Mdlle. Nowotny could hardly ever bear to walk in the garden or on the street from west to east, if it lasted for some time.

"69. Thus, eight different cases of sensitive individuals agreed in this, that every other position, except that from north to south, is highly disagreeable, but that from west to east almost intolerable, at least in our hemisphere. Probably in the southern hemisphere it is otherwise. The cause of these phenomena can obviously be found only in that great magnet which is formed by the earth with its atmosphere, that is, terrestrial magnetism. Like any other magnet, the earth interferes, and we thus arrive at the following law:— The terrestrial magnetism exerts on certain persons, both healthy and otherwise, who are sensitive, a peculiar influence, powerful enough to disturb their rest, and in the case of dis-

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eased persons disturbing the circulation, the nervous functions, and the equilibrium of the mental powers."*

Let it not be supposed that we wish to identify the morbific force which produces cholera with electricity or magnetism in any of its forms. Our only design is to direct attention to the remarkable fact that there is *constantly* in the atmosphere a subtle force moving in a given direction, which has the power of affecting with severe illness persons peculiarly susceptible to its influence, and that thus it offers a closer analogy than any other constant natural force with the peculiar morbific influence we are now considering.

Before leaving this part of the subject altogether, we are tempted to add one observation. It has been remarked by various writers that the electric force in all its various modifications is the great antagonist to the force of attraction. The one is, to borrow a phrase from political life, the conservative and the other the radical power. Attraction holds things together, binds the planets to their suns; the electric force gives life and activity to the materials of which all matter consists. Neither vital nor chemical action can go on without it. The course of the earth, in obedience to the general law of gravitation, is from west to east, the course of epidemics is from east to west.

Again, we disclaim any intention of building a hypothesis, but we throw out these random hints in the hope of stimulating the curiosity of observers, and inducing them to direct their investigations in the direction where we have most hopes of discovering the laws by which the mother earth, with its mantle of air, " its glorious canopy of light and blue," is so intimately united with all that dwell upon its surface.

*** Abstract of "Researches on Magnetism and on Certain Allied Subjects," including a Supposed New Imponderable. By Baron von Reichenbach. Translated by William Gregory, M.D., Professor of Chemistry in the University of Edinburgh.**

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CHAPTER II.

IS IT CONTAGIOUS?

We have done with the march of cholera from India to Britain, and we now come to speak, not of its progress, but of its diffusion. This is not only a different question but one which requires an opposite method of investigation. As an illustration, let us suppose that we wished to explain such a phenomenon as this. A wind is observed to blow always in a given direction from south-east to north-west, and this wind is of a peculiar quality, and as it proceeds on its course, it spreads to a certain extent through the surrounding atmosphere. In seeking to determine the force and direction of this moving column of air, we must take the measurement of the earth as the basis of our calculation, and we may arrive at the conclusion that the phenomenon is caused by the difference in the velocity of the atmosphere at the poles and at the equator; but this does not bring us a step nearer the explanation of its diffusion. To ascertain this we must make a series of experiments, as well as observations, and by doing so in the laboratory we may arrive at the knowledge of the law that gases tend to intermingle with one another in the inverse ratio of their density. The knowledge of this latter law would not at all assist us in explaining the trade-winds, any more than would the trade-winds explain the diffusion of gases. So

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it is with the question now opening to us. In tracing the march of cholera, we sought as high a point of view as possible, that we might survey an immense extent of the earth's surface, and estimate aright the strides of the destroying angel. This was absolutely necessary, when many degrees of longitude intervened sometimes between his footsteps. It was like following the course of some mighty conqueror with a telescope from a point far above the earth. To determine the important question of the contagiousness of cholera, we must track it from house to house, from room to room, from bed to bed. We must prepare ourselves for investigating the most minute particulars, like a police-officer. The one would be the task of a Fouché, the other that of a Humboldt.

We want to make out whether the cholera is contagious or not. Let us first distinctly understand what we mean by contagious. Suppose a person has got small-pox, and six other persons attend him, and two of the six on going home fall ill of small-pox, and six persons attend each of them in their separate abodes, and again two of each of the six take the disease likewise, and so on until it is a notorious fact among the community that a person who has been in attendance upon another having small-pox, is more liable to be attacked by the disease than his neighbours, who do not come in contact with persons so affected; then we say that small-pox is contagious.

The simple common-sense view of the matter is, that communication with the sick gives a liability to the particular disease they suffer from. Nobody says that contact with the sick is the only way of getting the disease, otherwise how did the disease first begin? There must have been a first case of every disease; and unless we suppose that Adam on his expulsion from Eden was immediately smitten with

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all infectious diseases—which is hardly compatible with his maintaining himself and Eve by his exertions, and founding a family which has lasted for six thousand years—some one of the human race must have become spontaneously ill of a disease which afterwards he gave to his neighbours.

Here, then, is the first stumblingblock—a disease may be contagious, and yet arise without contagion. There is little doubt that typhus fever is contagious, and as little that it attacks persons in certain localities who have not been exposed to contagion.

The next ambiguity we encounter is, that contagion is almost never universal. If it were so our race would have been extinct long ago. Only certain persons are liable even to the most contagious diseases. There are many examples of heroic exposure to "the plague," both by physicians and priests, many of whom escaped the disease; so that we can hardly conceive a more senseless proceeding than experimenting on oneself with a disease reputedly infectious; as for example, wearing the clothes of persons who had died of cholera, or sleeping in the bed of a cholera patient, and then if no bad consequences followed, holding that up as a proof that the disease is not contagious. It only proves that the very foolish individual happened not to be liable to its influence.

We start then with these preliminary assertions, that diseases of the most certainly contagious character occur without contagion, and that all persons are not liable to any, even the most virulent contagion.

Before investigating the facts which bear upon the contagion of cholera, we propose giving a summary of those which bear upon the contagion of plagues, that we may have a sort of model before our eyes; and for this purpose we shall take as an example the plague at Marseilles, in the

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year 1720, as affording useful instruction in all the points we hold it of importance to bear in mind. Our chief authority is Russell's History of the Plague, and when no other work is referred to, this clear and able narrative is the source of our information.

According to Dr. Russell, (the author of the History of Aleppo,) the plague raged with unusual violence in Syria in the year 1819; and, as is usual in such circumstances, great numbers had fled to the coast, and the sea-port of Sidon was almost certain to have many of the infected among its visitors. It actually broke out there in the beginning of February 1720. A few days before its outbreak, upon the 31st of January, a ship, laden with the usual spoils of the East, left the harbour, having a clean bill of health, and destined for Marseilles. Having sustained some damage from storms, she put into Tripoli, where she was repaired, and took in some Turks and merchandise. Soon after she left Tripoli, one of these passengers fell ill, and died. Two of the sailors prepared to throw the corpse overboard, but desisted at the desire of the captain, and left the ceremony to be performed by some Mohammedan passengers. They had touched the body, however. Within a few days both the sailors were taken ill, and died. The ship touched at Cyprus, and landed her remaining passengers, glad to escape, no doubt. Soon after leaving Cyprus, another sailor and the surgeon died very suddenly. Before reaching Leghorn, three more sailors were taken ill, where they were landed, and soon afterwards died. We have thus seven deaths among the crew of a trading vessel in the course of a few weeks; that vessel being come from a port where the plague was *known* to rage a few days after the ship had quitted it. There cannot be a doubt as to the dreadful character of this vessel's freight now. Notwithstanding her clean bill of health, the plague

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was on board ; and Captain Chataud, who commanded her, kept himself aloof from the rest of the crew, and had all the bedding of those who died destroyed. He, at least, was of opinion that this fatal disease was contagious.

While this ship was making its voyage down the Mediterranean, the town of Marseilles was in its usual state of health, and little aware of the dangerous cargo to which it was opening its ports.—" Two days after the arrival of this ship, one of the sailors died ; on the 12th of June, an officer of quarantine, who had been put on board, died also ; and this was followed by the death of a cabin boy on the 23d. About the same time, some porters employed in opening the merchandise, in the Lazaretto, were taken ill, and died ; in the first week of July, three others fell sick in like manner ; but in these, buboes were discovered in the axilla and groins. The surgeon of the Lazaretto, who had hitherto ascribed the alarming mortality to ordinary fevers, now, for the first time, expressed his suspicion, and a consultation being held with two other surgeons, they, after visiting the sick, gave their opinion in the most express terms to the Council of Health, that the three patients had the plague. This was on the 8th, and all three died next day. The priest who had administered to the sick, and the surgeon of the Lazaretto, with part of his family, were infected also, and died.

" According to the historical account, the distemper discovered itself in the city about the 20th of June ; but instances were rare before the first of July, when several accidents happened in the Rue de l'Escale. On the 9th, Messrs. Pissonel, physicians, gave information of a young man taken ill in another quarter of the city ; the sister was taken ill the next day, and the brother died. She, with the rest of the family, were transported to the Lazaretto, where they all perished. It should be remarked, that the passengers in

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the ships which arrived afterwards from the Levant, the end of May and in June, notwithstanding they brought foul patents, having performed only the usual quarantine of six-teen or nineteen days, were admitted into the city soon after the middle of June. Of these, one named Boyal, died with a bubo in the arm-pit. From the 12th of July to the 23d, there was a deceitful pause, during which the popular apprehensions began to subside. The physicians were reproached with ignorance in having mistaken ordinary fevers for the plague ; and the precautions taken by the sheriffs were condemned as unnecessary. The disease however, in this interval, had continued to spread in the Rue de l'Escale, of which the Council of Health were informed about the 18th. A surgeon, who was sent to examine into this matter, declared the disorder to be a worm fever. About the 23d the Council were informed of the death of no less than fourteen persons in that quarter, and of several others falling sick. The surgeon adhered to his former opinion ; but a physician, who accompanied him at this visit, declared the distemper to be the plague. From this time the plague spread in different places, and by the end of the month had got into the suburbs. Four physicians were appointed to attend the infected, and all declared the disease to be the true plague ; but it having been hitherto confined chiefly to the lower class of people, the report of the physicians was not credited, their persons were insulted in the public streets, and the popular infatuation did not cease till some of the inhabitants of better rank were taken ill. After the first week of August the distemper increased rapidly, and universal dismay soon succeeded.

" Such was the rise of the plague at first, and its progress afterwards in the months of June and July ; whence it appears that persons on board the suspected ship, those em-

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ployed in airing the goods, a surgeon and a priest who attended the sick, were among the first infected. That the passengers from the several ships, all of which ships, the first excepted, brought foul patents, were, together with their baggage, admitted into the city, after performing a quarantine of little more than eighteen days. That the distemper from the 20th of June till towards the end of July, advanced very slowly, and sometimes seemed to pause. That it attacked chiefly the poorer sort of people, and was found in distinct quarters of the city, but more particularly for some time among families inhabiting the Rue de l'Escale, where it broke out the beginning of July. And lastly, that during the first forty days, few or none of the infected recovered ; a circumstance entirely consonant to what was observed in the beginning of the plague at Aleppo."

" The report transmitted to the Regent by M. Chicoyneau, the 18th of August, represents the physicians and surgeons as unanimous in their declaration, ' that when one person in a family was attacked and died, the rest soon underwent the same fate, insomuch that there were instances of families entirely destroyed in that manner ; and if any one of an infected family fled to another house, the contagion accompanied him, and proved fatal to the family where he had taken refuge.'

" The first hospital opened for the infected proved fatal to all the attendants. The introduction of the plague into the Hôtel Dieu was traced to a woman received as a patient from the Rue de l'Escale, the street where the distemper first broke out. Two of the nurses who assisted at her reception, and the matron who changed her linen, were taken ill next day, and died after a few hours' illness. From them the contagion spreading with dreadful rapidity, destroyed physicians, surgeons, apothecaries, confessors, and all the

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other officers and servants of the house, with the whole of the poor in the hospital, including above three hundred foundlings. The priests and monks who attended the infected suffered in the same manner as the medical assistants, but many of them caught the infection by unguarded intercourse before the distemper was publicly avowed. Lastly, of two hundred and thirty galley-slaves, employed in going into the infected houses, and in burying the dead, two hundred and twenty perished in the space of ten or twelve days. It were superfluous to collect a greater number of particular instances, where the whole tenor of the history concurs to establish the fact in question."

The plague raged with great violence in August and September, destroying sometimes 500 in one day. It declined as suddenly in October, and continued to lessen until it had almost entirely disappeared in January and February of 1721. The number of inhabitants at the commencement of the plague, was reckoned at 90,000, and of those 40,000 are supposed to have died. As it declined in Marseilles, it spread into the surrounding country, which till then had been exempt.

Would the plague have broken out at Marseilles had Captain Chataud's fatal ship been wrecked on its way, and never reached the shores of France? We are disposed to believe that it would not, if all communication with the East had been prevented. For even when the plague was raging in Marseilles itself, those who kept themselves strictly excluded, were not attacked by it. We have seen that it destroyed about one-half of the inhabitants, and yet we have the positive assertion of the Bishop of Marseilles, that "during the desolation of Marseilles in 1720 and 1721, the plague did not penetrate into the religious communities who had no communication with persons outside." We are too good

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Protestants to ascribe this exemption to any miraculous interference in behalf of the inmates on account of their superior sanctity; and therefore can find no other reason than that they had no communication with those affected with plague. We must remember that at that period the number of "religieuses" in France was immense. It was before her expurgation—to use the term employed in describing the clearing of a town from the plague.

The exemption of the convents from the plague forms a contrast between it and the cholera, as we observed that one of the first cases of cholera at Moscow was in a convent; as also the great tract of intermediate country which remained free of all infection. The plague follows the line of human intercourse, and when that line is in the sea, which cannot be infected by the troubles of man, it strikes root the moment it touches land. It colonizes—going from port to port. It does not sweep over vast districts, like an inundation of barbarous hordes.

Although the plague is undoubtedly a disease which requires human intercourse to spread it, yet that is not sufficient of itself. The fuel must be prepared, or the spark falls in vain. It spreads only at particular seasons, and in particular places. We have given an example of its arrival at a place where all was ready for its reception, and where its triumph was instantaneous. We shall now give one of its arrival at a place where it made slow progress at first, and had difficulty in effecting a footing. This is the intermediate link between such a place as Marseilles and the rest of France, which at that time was not infected at all. Our example shall be the island of Cyprus,* in 1759.

"In the month of April, 1759, a large Turkish vessel, laden at Alexandria, and bound for Constantinople, was wrecked

* See the Map attached to this volume.

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in her passage, not far from Cape Baffa. Of the crew who were saved, a great part happened to be infected with the plague; which was first communicated to certain villages on the road to Limosal, and afterwards to that town itself.

"Some of the sailors died in the villages. The rest, after a short stay at Limosal, proceeded to Larnaka; where they remained only a few days till a vessel presented, in which they crossed over to Syria. None of them died in Larnaka; though it was known that several actually had the plague.

"The contagion spread with such rapidity at Limosal, that, in the month of June, upwards of four hundred persons were reckoned to have died of it. Many of the inhabitants fled to the neighbouring villages, and to the mountains, transporting the contagion along with them. But though the plague showed itself now and then in those parts where the fugitives had taken shelter, as well as in other inland villages which had intercourse with Limosal, yet it was only about Baffa, and near to Limosal, that it spread considerably.

"The condition of Larnaka, at this period, was remarkable. It had received part of the infected crew from Limosal; it had maintained a constant intercourse with the infected quarters of the island; peasants and mule-drivers from those parts, with the pestilential sores on their bodies, were daily in the streets and markets; and some of them died in the houses of Larnaka. On the 22d of May, a vessel arrived from Damietta, which put on shore some infected passengers and sailors, who lodged in the houses, and communicated freely with the natives. Another Turkish vessel, from the same place, arrived some time after, with infected persons on board, one of whom died on landing at the Marine. Notwithstanding this new importation, none of the inhabitants of Larnaka were known to have contracted the plague. The Europeans, from whom many of the above cir-

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cumstances were, at the time, carefully kept secret, observed no precautions for their own safety ; while the natives consoled themselves with a traditionary notion, that a plague which did not begin in December, was not to be dreaded.

" During the hot months of July, August, and September, little was heard of the plague, and it was generally supposed to be extinguished at Limosal as well as in the villages ; but the truth was, it had all along continued lurking in those parts, showing itself only by starts, particularly at Baffa, Piscopi, and other villages on the western and southern sides of the island.

" In the month of October, the plague increased in those parts where it had appeared in the spring, and soon after, broke out at Nicosia, to which place the annual fair of St. Demetrio had drawn a great concourse of people from most parts of the island. The magistrates of Nicosia endeavoured at first to conceal the nature of the distemper, under the name of a malignant fever ; and in December, when eight or ten died daily, the dead bodies were buried privately in the night, in order to prevent the inhabitants being alarmed by frequent funerals. But, towards the end of the year, matters became too serious for stratagems of this kind ; for the contagion, which had, some time before, got among the Greeks and Armenians, was now arrived at such a height, as on some days to carry off fifteen Christians ; which people, in number, bear a small proportion to the Mohammedans.

" The Europeans at Larnaka, deceived for some time by false accounts from Nicosia, continued to walk about without apprehension ; and even when better informed, by letters from the Terra Santa convent, about the beginning of January, which clearly asserted the nature of the malady reigning in the capital, and which carried off between forty

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and fifty persons daily, they still were inclined to doubt the intelligence, and to indulge ill-grounded hope: neglecting those precautions which, however salutary, must in some measure bring all commercial affairs to a stop.

"Towards the end of January, the plague advanced so dreadfully at Nicosia, that the Mohammedans enjoined public processions and supplications: an expedient which, by bringing together a promiscuous crowd of people, served only to propagate the contagion more effectually. The Europeans at Larnaka now caught the alarm; for the fugitives from Nicosia, exaggerating the scenes of calamity from which they had fled, spread terror wherever they came.

"In the beginning of February, the distemper appeared among the Turks at the Marine, and soon after, at Larnaka. The Europeans shut up. The daily burials soon increased to eight or ten; and during February, never exceeded twenty. In the month of March, the disease would appear to have been more malignant than at first, for few or none of the infected recovered. The daily funerals arose to twenty-five and thirty; and many of the inhabitants fled to the mountains.

"The distemper continued to rage at Larnaka all the month of April; and spread, at the same time, over the island—penetrating even into the province of Carpass, a circumstance not known to have ever happened before. At the Marine, the daily burials decreased, which was attributed to the flight of the wretched inhabitants; many of whom, like those of Larnaka, abandoned their half-desolate houses, and sought refuge in the country."

It committed such devastation over this country, that there were hardly hands enough left to gather in the harvest: giving a sad significance to the cypress-tree, which derives its name from the island.

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Had there been a Parliamentary Commission sent to Cyprus in the year 1759 to ascertain whether the plague was an infectious disease, it might have reported in the negative; and had it qualified its report by the adverbs *there* and *then*, it could have incurred no blame; for, in some places at least, it hardly exhibited its contagious character. We may thus learn, no opinion upon the contagiousness of a disease is of any value beyond the time and place which afford the facts on which the opinion rests. Because the plague was not contagious at Cyprus, or but slightly so at one time, it did not thence follow it was not contagious at Aleppo or Marseilles. Contagiousness is not an essential attribute of any disease; it is an accident dependent upon many modifying causes.

Let us now proceed to apply this lesson to the most important question, of the contagiousness of cholera. Before investigating the evidence in favour of the cholera being contagious, we shall briefly advert to the opposite view of the case. In the Second Report of the Metropolitan Sanitary Commission, p. 56, we meet with the following sentences:—

"1*st*, That the disease, as it has recently appeared in Persia, in Trebizond, and in Russia, is unchanged in its general character, *i.e.*, from the former epidemic.

"2*d*, That the more recent experience in Russia has led to the general abandonment of the theory of its propagation by contagion—a conclusion in which, after a full consideration of the evidence presented to us, we fully concur."

We are naturally anxious to know what evidence was presented to Her Majesty's Commissioners, on which they founded the gratifying conclusion that cholera is not contagious. The evidence is from the following sources:—*first*, The despatch of Doctors Sapi and Borg to the Vice-Consul at Constantinople upon the disease, as observed by them at

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Trebizond ; *second*, The report of the physicians appointed by the Swedish government to investigate the disease at Moscow ; *third*, and *last*, The opinion of Indian practitioners. Admitting the evidence derived from these places to be unexceptionable, what is the only conclusion which it justifies? Neither more nor less than this, that the cholera was not contagious in Turkey, Russia, and India. And the Commissioners have no right whatever to make the abstract assertion, that the cholera is not propagated by contagion.

But it may be asked, How could these Commissioners get at any other evidence? They could not bring the cholera here, and experiment on the effect of another latitude and another climate. We reply, that had already been done for them. If the cholera was quite unchanged in all its features when it reappeared in Russia and Turkey, is there any reason to suppose it will be changed when it appears here? Unless the Commission had the clearest proof that there had been such a change in the climate and constitution of this country since 1832, as would necessarily modify the character of an epidemic like the cholera, and strip it of its contagious qualities, it was their bounden duty to investigate the evidence for and against the contagiousness of the disease in its former visitation. This were far more germane to the matter than telling us it was not contagious in India. It is not so long since the cholera was here as that all who had to do with it then are now dead and not to be had as witnesses, and even were it so, there is ample contemporary testimony on which a sound judgment may be founded.

We propose now leading evidence to prove, that both in the former and recent epidemic, the cholera was contagious in Scotland. The Commissioners are not to blame for being ignorant of the contagion of the recent epidemic, but we

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think they are to blame for rashly concluding that it would not be contagious. And what we most dislike, is their speaking about the demoralizing effects of the doctrine of contagion. Careful investigation and accurate conclusions are the morals of science. With the consequences which may flow from the discovery of truth, scientific inquirers, as such, have nothing to do.

To return from this digression, we shall proceed at once to call our witnesses to prove that, in Scotland in 1832, the cholera was contagious; and in doing so, we shall quote largely from an article that appeared in No. cxxxv. of the Edinburgh Medical and Surgical Journal, by Professor Simpson of Edinburgh,* as we look upon it as a model of scientific investigation, worthy of the present renown of its author, which this and his other early labours show to be no less well earned than it is now far spread.

"The Leith and London Smack Trusty arrived at London on the 19th of February, and after remaining in port for fourteen days, sailed again on the 4th March, with ten of a crew, including the captain and mate, and six passengers on board. In London, the cholera was then prevailing to a considerable extent, more particularly on the side of the river, and in the quarter connected with the shipping.—1. On the morning of the 6th, the cook was attacked with cholera at sea, and died on the 7th.—2. Another seaman complained of headache when the vessel was brought up in Leith roads (a distance of about 400 miles from London) on the evening of the 8th. This man assisted on the same night another of the crew and a cabin boy to pull ashore the six passengers, in the boat belonging to the smack. When he reached the

* On the Evidence of the Occasional Contagious Propagation of Malignant Cholera, which is derived from cases of its direct importation into new localities by infected individuals.

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harbour, however, he found himself so unwell as not to be able to return on board, and died of cholera next morning in the Leith Hospital at twelve o'clock. This was the second case of the disease observed in Leith, the first having occurred about a month previously in a man who had been visiting his infected relations at Musselburgh.—3. The other sailor who landed with him was also obliged to remain on shore, and had an attack of cholera that night, but recovered. —4. On the morning of the 9th, another of the crew of the smack was seized with vomiting and purging immediately after the preventive boat visited the smack in the roads ;— and the vessel having been ordered ten miles up the river to the quarantine station at St. Margaret's Hope, he was, when the vessel arrived there about five o'clock of the same evening, transferred to the hospital-ship Nymphe. The Nymphe (one of the old men-of-war employed as quarantine vessels in the station) had been previously cleared out as an hospital-ship to receive a suspicious case of cholera which had occurred on board one of the vessels under quarantine on the 2d March, but this man had been discharged as well on the 5th. At the time that the sailor from the Trusty was placed in the Nymphe, on the evening of the 9th March, the Nymphe had only two mariners left on board, who had volunteered to act as nurses. On the 11th, two other mariners were joined to these ; and on the 16th, a fifth was added. The sailor from the Trusty had a severe attack, but continued in life till the 16th.—5. In the afternoon of the 10th, a second sailor was transferred from the Trusty to the Nymphe, labouring under cholera. He recovered.—6, 7. On the 11th, two new men were attacked, and sent to the Nymphe, both of whom died. One of them was a Leith porter, who had come on board the vessel in Leith roads, having returned with the boats which landed the passengers.

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He and the pilot (who had joined the smack near the mouth of the river in Dunbar Bay) having been found on board by the officers in the preventive boat, were obliged to proceed with the vessel to the quarantine station. This porter, Murray, was cut off by the disease after an illness of only twelve hours' duration.—8. On the 12th, another of the crew of the Trusty was attacked and transferred to the Nymphe, but recovered in the course of a few days.

"Thus out of the whole crew of the Trusty, ten in number, one died of cholera at sea; a second on shore at Leith; a third remained there, but recovered; a fourth, whose case proved afterwards fatal, sickened while the vessel lay in Leith roads. Three others were attacked in St. Margaret's Hope, and sent on board the Nymphe; and of these three, one recovered and two died. The porter who joined the vessel at Leith also took the disease there, and died. The three remaining members of the crew, and the pilot, who came on board in Dunbar Bay, had each an attack of diarrhœa.

"Of the *five mariners* who had acted as nurses to the crew of the Trusty on board the hospital-ship, one was attacked with cholera during the afternoon of the 15th, and died in less than twelve hours. On the 24th, another of them was attacked with nausea, vomiting, purging, and tenesmus, but recovered. On the morning of the 27th, a third is reported in the ship's journal as attacked with the premonitory symptoms of cholera; but is entered as better on the 28th and 29th. On the evening of the day on which the third nurse was attacked, a sailor was sent on board the Nymphe from a second infected vessel that had arrived in the quarantine ground, but up to that day only the men of the Trusty had, with the exception formerly noticed, been on board of her as patients."

Dr. Simpson himself minutely inquired into the details of this case, and guarantees the accuracy of the statement.

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The following instance is reported by Dr. Brewster, brother of the celebrated Sir David Brewster, and clergyman of the parish in which Ferryden and Boden are situated :—

"The village of Ferryden is placed on the south bank of the South Esk, opposite to the town of Montrose, and contains about 700 inhabitants. The district of country in which it lies remained altogether free of cholera, when, in 1832, and the earlier months of 1833, the disease was prevailing in different parts of the kingdom. In the end of June 1833, the smack Eagle, from London, arrived at Montrose. Two cases of cholera had occurred amongst the crew during the passage from London, one soon after the smack left that port, and the other off Harwich. As soon as the vessel reached Montrose river, the crew dispersed to their several homes. One of them, Robert Findlay, an inhabitant of Ferryden, carried his clothes and bedding to his house there. A day or two afterwards, two children in the village, who were reported to have been seen tumbling during the preceding day on Findlay's mattress as it was laid out to the air, were seized with rapidly fatal cholera, and died on the 2d of July ; and this, it may be proper to remark, took place at a time when the disease was considered to have nearly or entirely disappeared from Scotland. On visiting Ferryden that day, Dr. Brewster found the mother of the two children labouring under a fatal attack of cholera. The malady subsequently spread through the village, but not rapidly ; and during the four weeks it continued, it carried off twenty-seven out of the 700 inhabitants, or nearly one out of every twenty-seven of the residents. It appeared (Dr. Brewster observes in the communication with which I have been favoured) in different parts of the village in succession, and almost uniformly among the relatives, visitors, and neighbours of those who were previously af-

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fected. Out of the few cases, he adds, which appeared in Montrose, two were relatives of the sick in Ferryden, whom they had gone to visit there, and were themselves seized with the disease after their return home. The inhabitants of the adjoining district of country in general carefully avoided all communication with Ferryden, and the disease only appeared in one other part of the parish, viz., in Boddin, a small village on the sea coast, nearly three miles south from Ferryden. Only two cases occurred in this locality, but these two afforded strong corroborative testimony of the contagious property of cholera. Margaret Stott, a young woman, an inhabitant of Boddin, went to visit her sister at Ferryden, and, upon returning to Boddin, was seized with the disease, and died in two days. Jean Peterkin, an aged woman, who lived in the house adjoining to that of Stott, and who had not been out of the village, assisted, amongst other things, in putting Stott's body into the coffin, and afterwards washed her bedding. In the course of two or three days, she had a fatal attack of cholera. No other person (Dr. Brewster adds) in the village of Boddin, or in the parish, or in the surrounding district, with the exceptions now noticed, was affected by the disease."

The next case rests also on Dr. Simpson's own authority:—

"In the village of Bathgate, which contains a population of nearly 3000 inhabitants, and is situated in West Lothian, eighteen miles west from Edinburgh, on the great road between that city and Glasgow, six cases of pestilential cholera occurred during the prevalence of the disease in Scotland—four of them in persons who came to the town from infected districts, and the two others in the female villagers who acted as nurses to these strangers. There were two importations of the disease.

"*First*, A middle-aged female stranger was allowed;

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secretly and contrary to the orders of the Local Board of Health, to enter one of the lodging-houses within the outskirts of the village, on the evening of the 20th April 1832. This woman had, as was afterwards ascertained, been for some time a resident in Glasgow, but she had gone two or three days previously to Edinburgh, (where the cholera was at that time prevailing,) in order to relieve some goods lying in a pawnbroker's shop. After having lodged in Edinburgh for either one or two nights, she set out again for Glasgow on the morning of that day on which she reached Bathgate. By the time she arrived at this latter place, she was *already* complaining of being unwell, having become indisposed upon the road; but her state was not such as to alarm the lodging-house keeper, or to prevent him admitting her. Having manifested, however, during the night, well marked symptoms of cholera, her condition was early on the following morning reported by Mr. Dixon, surgeon to the Local Board of Health, who immediately adopted all the means necessary to prevent the spread of the disease, and sent a female, who had been eighteen months resident in the village, to attend her as a nurse. The stranger died on the night of the 22d April, after an illness of about forty hours. Next day the village nurse, after being engaged in washing the clothes of the deceased, was seized with all the most marked symptoms of malignant cholera. She recovered, however, after passing through a very severe attack of the disease.

"No other cases of cholera were seen in the village till the evening of the 27th of April, when the second importation of the disease took place in the persons of three female mendicants, who had, the second or third day previously, left Edinburgh, having been lodging there in Blackfriar's Wynd, where the disease was then prevailing. On the 25th they were in the immediate vicinity of, and probably visited

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Newbridge, a small village at mid-distance between Edinburgh and Bathgate, and in which cholera was perhaps more prevalent and fatal, proportionally to the number of inhabitants, than in any other locality in Scotland. That night (25th) they slept at the farm-house of Niddry Mains, and while there, either one or two of them complained of being unwell, so much so that they did not reach the village of Broxburn (which is only about a mile distant from the farm-house, and about two miles westward of Newbridge) till the afternoon or evening of the 26th. Mr. Andrew Millar, the son of the farmer at Niddry Mains, was obliged, as I am informed by Dr. Thomson of Broxburn, to come out of church on the following Sunday (the 29th) from sickness, followed by an attack of diarrhœa and some vomiting, which continued for about two days. His father, who had been for some time in an infirm state of health, became suddenly much indisposed on the evening of the 4th May, had rice-water evacuations to a great extent during the night, with much sickness and sense of sinking, and when seen by Dr. Thomson on the following morning, was evidently in the collapsed stage of cholera, and died that afternoon. These two cases of the Messrs. Millar were, as Dr. Thomson assures me, the only instances of the disease among the resident inhabitants of the extensive district in which he practises, with the exception of either one or two examples of persons who had been exposed to the disease in Edinburgh, and who had afterwards sickened at Broxburn.

" But to return to the three mendicants. They took up their abode during the night of the 26th in a lodging-house at Broxburn, and endeavoured, as was afterwards confessed, to conceal the disease under which they were labouring. Next morning two of them presented such open and alarming symptoms of cholera, that all of them, however inhu-

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manely, were forced out by the lodging-house keeper, and after lying on the public road for several hours, they were, by the local authorities of the place, forwarded in an open cart to Bathgate, a distance of seven miles. By the time they reached Bathgate they were both in the stage of collapse, and were immediately placed in a room in the village jail, a somewhat isolated building, situated in almost the very centre of the town. The elder stranger sunk in thirty hours after her arrival, and the younger one, her foster-child, survived only for about twenty-four hours longer. Three female nurses, all natives, and resident in Bathgate, were engaged to attend these cases—a duty in which they were assisted by a niece of the elder stranger, who had accompanied her. One of these three town nurses was attacked with cholera on the morning of the 30th, the day on which the younger stranger died; and she sunk under the disease in the course of about eighteen hours. On the same day also, the third remaining stranger, a girl of twenty, became affected with the disease, and died of the secondary head affection on the fourth day afterwards. Besides the four nurses that I have mentioned, there were also necessarily freely exposed to the contagion in Bathgate the landlord and his wife to whom the lodging-house belonged in which the first patient died, and where her nurse was confined, as well as the four surgeons of the village, (one of whom lived with the patients as a nurse,) the clergyman of the parish, who was most assiduous in his attentions to the sick, and a man who frequently visited them and acted as porter to the hospital. None, however, of these or of the other inhabitants became affected with the disease, with the exception of the two nurses, and perhaps we may add, one of the surgeons, (Mr. Dickson,) who had an attack of tormina and diarrhœa. The villagers in general, under a salutary

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dread of the disease, avoided as carefully as possible all intercourse whatever with the infected persons and houses.

"All the district and villages more immediately around Bathgate totally escaped any attack of cholera. The nearest point at which the disease is known to have occurred was at Linlithgow, which lies about seven miles to the north, where one or two suspicious but not decided cases were observed. Towards the east, Mr. Millar's of Niddry Mains, about eight miles distant; and to the south, some cases to be afterwards mentioned, which occurred at Carnwath, ten or eleven miles distant, were, I believe, the nearest seen in these directions; and on the west side the disease does not seem to have shown itself nearer than Clarkstone, a village thirteen miles distant, and in which it prevailed to a considerable extent. In this calculation, I do not of course include some instances in which the affection was observed in the passengers in the canal boats, and others who were passing through the district, or who came to it, after being already exposed in infected localities, and died without propagating the disease. One or two such cases were seen by the medical men both of Linlithgow and Broxburn."

Here, as in the case of the plague at Larnaka in Cyprus, the fuel was not then ready, and the disease appeared like a spark from a flint without tinder for it to fall on, a moment incandescent, and straightway cold again. It may burn the hand of an individual, but cannot fire a village.

We shall conclude our extracts by the following, which enables us to bring forward the valuable authority of Professor Alison, who is celebrated alike for his wisdom and his goodness:—

"Before cholera reached Edinburgh, it raged for some time previously in a severe degree in the district of country lying to the east of the city, as in Haddington, Tranent,

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Prestonpans, &c., and particularly in the town of Musselburgh, six miles distant. The first cases of the disease which were observed in Edinburgh, occurred towards the latter end of January 1832, and were all in the persons of individuals who had been visiting some of the places to the eastward where the cholera was prevailing, and who had consequently been directly exposed to the morbific cause or causes of the malady (whatever we allow these to be) which were operating in these infected localities. The second case (27th January) afforded an instructive example of the great difficulty which is often experienced in endeavouring to arrive at the truth in such investigations as the present. The subject of the case, an Irishwoman, residing in a close off the West Bow, was taken to one of the cholera hospitals, and was for some time conceived to afford the strongest possible evidence against the doctrine of contagion, for she stoutly denied having been out of Edinburgh. During the period of her convalescence, however, she voluntarily mentioned to Dr. Ransford, then clerk to the hospital, that she had been some days previously singing in the streets of Haddington, Tranent, and Musselburgh, and had slept at Prestonpans in the bed of a cholera patient; and she stated that she had been before deterred from making this confession, under the dread that she would be punished for bringing the disease into the town.

"None of the three first cases of importation of cholera into the city proved effectual in propagating it to any of the resident inhabitants; and no instance of a person being attacked with the malady, who had not been in the infected eastern districts, occurred till Saturday, the 28th of January, when a woman, Widow Macmillan, died of it in Skinner's Close, High Street, after nursing her grandson, who was previously ill of the disease, and had been exposed to its

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contagion by residing in a house in Musselburgh, in which several fatal cases took place. Professor Alison has been so kind as draw up for me the history of these two cases, in as far as they bear upon the question of imported contagion; and I shall here give the communication with which he has favoured me in his own words, and with his own excellent prefatory remarks and comments.

"'It seems to me clear,' he observes, 'that the evidence of the contagious nature of any disease turns ultimately on a calculation of chances. The question always comes to this,—Is the circumstance of intercourse with the sick followed by the appearance of the disease, in a proportion of cases so much greater than any other circumstance common to any portion of the inhabitants of the place under observation, as to make it inconceivable that the succession of cases occurring in persons having that intercourse should have been the result of chance. If so, the inference is unavoidable, that that intercourse must have acted as a cause of the disease. All observations which do not bear strictly on that point are irrelevant, and in the case of an epidemic *first* appearing in a town or district, a succession of two cases is sometimes sufficient to furnish evidence, which, on the principle I have stated, is nearly irresistible.

"'For example, in the case of Widow Macmillan, in Skinner's Close, it is certain, as the whole town was under medical surveillance at the time, and every one on the watch for cases of even suspicious cholera, that she was the *first* person in Edinburgh or Leith (*i. e.*, in about 160,000 people) who took the disease without having been in the district at Musselburgh, Tranent, &c., where it prevailed; nor was there any case in Edinburgh or Leith in a person who had not left the town for ten days after. And in regard to this first case of the disease in Mrs. Macmillan originating

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in Edinburgh, the following points were ascertained by a judicial inquiry or precognition made, at the request of the Board of Health, by the Sheriff of the county, who examined different witnesses on each point till he was perfectly satisfied of its truth. 1*st*, That the woman herself had never been out of the close in which she lived during the existence of the disease in the neighbourhood. 2*d*, That her son, a hawker, had slept in a house in Musselburgh, in which a woman was dying of the cholera, on the Monday. 3*d*, That after returning to town, he was seized on Wednesday with vomiting and purging of whitish or watery matter, cramps, and feeble pulse. I saw this lad myself on that day, and immediately suspected that he had been at Musselburgh, which was at the time denied, but afterwards admitted, and confirmed by abundant other evidence. 4*th*, That Mrs. Macmillan was with him during the day, in a small confined room, rubbing his limbs and nursing him, and he recovered under the use of opiates and stimulants. 5*th*, That on the Saturday, when he was convalescent, she was seized with the disease in its most virulent and unequivocal form, and died in ten hours. Now, I presume, it will not be denied that the epidemic cholera, which was never known in Edinburgh before 1832, and has not been seen in it since 1833, must have some cause or causes of local and temporary existence only. That the lad Macmillan, who had slept a night at Musselburgh, (then much affected with the disease,) should be seized with it, proves nothing as to the question, whether intercourse with the sick has the power of exciting the disease or not. But if that intercourse has no such power, it is plain that his mother, who never left her own close, had no more business to take the disease than any other of the inhabitants of Edinburgh or Leith, and her infection must have been a mere chance. The chances, there-

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fore, are nearly 160,000 to 1 against her being the first person in Edinburgh or Leith who should take the disease, and almost infinite to one against her being infected by it within sixty hours after her son.

"'From the time, therefore,' Dr. Alison adds, 'when I was satisfied as to these facts, I have never doubted of the disease having a contagious property, although I have never thought it proved that its extension is to be ascribed to that property alone.'"

Such is a small portion of the evidence accumulated during the previous visitation of cholera, illustrating the contagious nature of the disease. We shall now mention some facts of a similar kind in respect to the present epidemic.

Out of 183 cases treated by the physicians of the Edinburgh Homœopathic Dispensary, and scattered over the whole of Edinburgh, seventy-three were ascertained to have been exposed to contagion. That is more than a third of the whole number.

"Since the 28th of October," writes Dr. William Robertson, in an excellent article upon the statistics of the Cholera Hospital in Edinburgh, over which he presided, "eighteen nurses have been employed at different times in the Cholera Hospital; five of these have had severe attacks of cholera, and three have died. A sixth, who for twelve hours had frequent vomiting and purging, was treated as a cholera patient, and recovered; yet, at the same time, a very large number of nurses were employed in the neighbouring buildings of the Royal Infirmary, and escaped the disease. The circumstances, habits, and diet of both sets of nurses are the same. The work is not more severe in the Cholera Hospital than in the Infirmary. The arrangement for ventilation and cleanliness are not defective in Surgeon Square, (*i.e.*, in Cholera Hospital); but for nearly two months past, no

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cholera patients have been admitted into the Royal Infirmary. In illustrating the contagiousness of typhus fever we are accustomed to regard evidence of this kind as tolerably conclusive."

There are numerous caves in the neighbourhood of Naples, into one of them, called the Grotto del Cane, if a dog be put it dies. It does not die if put into any of the others; hence it is supposed that there is something peculiar in that grotto which kills the dog. There are two buildings in Surgeon Square, into both of which a number of women are put of the same class and character. The whole that enter one of the buildings come out as they went in. Nearly a third are smitten with a peculiar and fatal disease in the other building. Hence it is supposed that there is something in the latter building which destroys these poor women.

We shall now descend from generalities to particular instances, and our first document is a letter from Mr. Moir of Musselburgh, (a gentleman well-known in the republic of letters, under the Nom de Guerre of Δ, and whose accuracy and veracity are beyond dispute,) to Mr. William Scot :—

"INTRODUCTION AND SPREAD OF THE CHOLERA AT PRESTONPANS, KIRKLISTON, AND CARRINGTON.

"MUSSELBURGH, 2*d March*, 1849.

"MY DEAR SIR,—I promised to send you some corroborative proofs of cholera being a contagious disease in Scotland, from a sketch of its introduction recently into some of the localities in this neighbourhood; and I have selected Prestonpans for the purpose, from being fortunately enabled to obtain undoubted information regarding the first appearance of the disease there, and of the communication and consanguinity subsisting between the original victims.

"Without offering a word of comment, I subjoin a list of

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the first twenty-three cases, as successively registered in the books of the inspector of poor for the parish, and which have been extracted for me by my friend, Dr. Thomas R. Scott. For the local information I am indebted to Mr. William Alexander, salt-manufacturer, a gentleman resident on the spot, and who took a prominent part in the enforcement of local sanitary measures.

"CASE I.—Grace Blyth, seized on the 24th November, died on the 25th. Returned from Gilmerton on the 23d, whither she had gone to visit a relation labouring under cholera there.

"CASE II.—Jane Gibb, seized on 6th December, died on 8th. Washed the clothes of Grace Blyth on the day previous to her own attack.

"CASE III.—George Mitchell, seized on 7th December, died same day. Lived in the house adjoining the two first cases, and had visited both.

"CASE IV.—Fanny Gibb, seized on the 8th December, died same day. Sister of Jane Gibb, and laid out her body after death.

"CASE V.—Widow Bartleman's child, seized on the 8th December, recovered. House adjoining the two others.

"CASE VI.—Mary Anne Gibb, seized on 10th December, and recovered. Niece of Jane and Fanny Gibb. She was in service at Musselburgh, and was sent for to nurse her relatives.

"CASE VII.—Jane Troup, seized on 10th December, and recovered. The first six cases occurred at the western extremity of the village. Jane Troup, who went about collecting rags, got possession of some of the clothes of Fanny Gibb; took them to her house in the centre of the village, (the Big Wynd,) and was attacked on the succeeding day.

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"Case VIII.—Alexander Troup, seized on the 11th December, and died on the 16th. Husband of Jane Troup.

"Case IX.—Widow Bartleman, seized on 14th December, died on 16th. Mother of (Case V.)

"Case X.—Mrs. Fraser, seized on 14th December, and died on 15th. Attended Troup and his wife during their illness. Lived in adjoining house.

"Case XI.

"Case XII.

"Case XIII.—*Two* children of Mrs. Fraser were seized on the 14th December, shortly after their mother; a *third* on the 15th; and all three died on 16th.

"Case XIV.—Elizabeth Notman, seized on the 15th December, died on 16th. Attended Jane Gibb and several others. Washed Gibb's clothes.

"Case XV.—James Mackenzie, seized on 15th December, and died on 16th. Lived in the upper flat of Troup's house, and visited the family repeatedly during their illness.

"Case XVI.—Margaret Notman, seized on 16th, and died on 17th December. Daughter of Elizabeth Notman, (Case XIV.)

"Case XVII.—James Cameron was seized on 17th December, and died same day. Lived in house adjoining previous cases. (XIV. XVI.)

"Case XVIII.—Widow Crawfurd, seized on 17th December, died on same day. House adjoining Troup's and Fraser's, both of which families she visited.

"Case XIX.—Jean Deans was seized on 17th December, died same day. Aunt of Mrs. Fraser.

"Case XX.—Margaret Gordon, seized on 17th December, and recovered. Sister-in-law of Jean Deans, and washed her clothes.

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"CASE XXI.—Jean Hunter, seized on 17th December, and recovered. Lived in house adjoining that of Blyth, the Gibbs, and Mitchell, at west end of the village, all of whom she visited during their illness.

"CASE XXII.—Janet Deans, seized on 17th December, recovered. Sister of Jean Deans.

"CASE XXIII.—Margaret Notman, seized on 19th December, and recovered. Sister-in-law of Elizabeth Notman, (Case XIV.,) and mother-in-law of Mrs. Fraser, (Case X.)

"The total number of cases which occurred at Prestonpans was fifty-two, and the deaths twenty-seven. As I challenge investigation of this statement, you, my dear Sir, may make any use of it you please.

"Ever most truly yours,

"*William Scot, Esq.* "D. M. MOIR."

"P.S.—Since writing the above I have received the following strongly confirmatory statements relating to neighbouring localities—Kirkliston and Carrington; and I select them from among many others, which have been recently kindly forwarded to me, as comprehending the two great points at issue, in reference to the contagiousness or non-contagiousness of cholera—the importation of the disease from an infected district, and its spread from that importation in a previously healthy one. The first series of cases has been furnished to me by my quondam pupil, Dr. Andrew Legat of Ratho; the other series by Mr. Thomas Thomson, surgeon, Gorebridge, who also writes from personal observation.

"Up to Wednesday, 14th February, the parish of Kirkliston had kept perfectly free from cholera, when, at eleven o'clock on the evening of that day, an Irish labourer, John MacGochie, accompanied by his wife, arrived at the railway

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station there. Both went to bed apparently well; but, in a few hours, decided symptoms of the disease exhibited themselves in the woman. They had come from Ambleside, *via* Kelso, an infected town, where they had slept on the night preceding. She died on the forenoon of Friday the 16th.

"CASE II.—Occurred in Ronald Gillies, a Highland labourer, who lodged in the second hut from MacGochie's—the door of which he had to pass in getting to his own, and many times did so between the Thursday and Saturday when he took ill. Was at work on last-mentioned day, 16th, but had to come home. Died on Sunday, 17th, at nine, A.M.

"CASE III.—John MacGochie, the husband of Mary, (Case I.,) sat up with the body of his wife during the night of Friday 16th, and buried her on the following day, up to which time he felt well. Immediately after the funeral he went forward to Edinburgh, where he became ill, and was removed to the Cholera Hospital. He recovered.

"CASE IV.—The next person attacked was Miss Braid, the sister of Mr. Braid, surgeon. On Sunday morning her brother—who was by this time himself labouring under the premonitory symptoms—went directly home from the bedside of Gillies, (Case II.,) on whom he was in attendance, to his own house, which is at the opposite extremity of the village, and remained beside her for a considerable time before again venturing out. She was seized in the course of the day, and died during the night following.

"CASE V.—Poor Mr. Braid himself was the next who followed. As already mentioned, he had been complaining for two days previously; but it was not till Monday, 19th, at midnight, that cholera decidedly showed itself. At eight on the preceding evening he had assisted in placing the body of his sister in her coffin; and, at that time, said, 'he

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felt he was in for cholera,' owing to some peculiar sensations. Death followed at eleven, A.M., on Tuesday the 20th.

"CASE VI.—Occurred on Wednesday night, in a part of the village still more remote from the original sphere of infection. It was in the person of Mrs. Grindlay, the woman who acted as nurse to Mr. Braid. She also died.

"CASE VII.—Brings us back to the original locality. Mary Kerr, a woman inhabiting the house next MacGochie's, (Cases I. and III.,) was attacked early on the morning of Thursday the 22d. While in attendance on case first, Mr. Braid had come into her hut to rest, and he remained there for some time; and she said *she felt aware of a peculiar heavy smell* about his person, which nauseated her. On that day she took bowel complaint, which, however, continued moderate until Thursday, 22d, when the disease assumed its more decided and virulent form. She recovered.

"CASE VIII. (and last.)—Was John Gillies, a brother of Case No. II., and who lived in the same house. After labouring under the premonitory symptoms for some days, the disease assumed its more decided form; but he also recovered.

"As a preamble to the Carrington cases, communicated by Mr. Thomson, it seems necessary to state, that, while the pestilence was at its height in Glasgow, Mr. J——n, a mercantile gentleman there, fell a victim to it. This happened to be a son of a respectable farmer in the parish of Libberton, adjacent to Edinburgh, who sent a brother of the deceased to bring home his remains for interment. This unfortunate proceeding was followed by the seizure of two brothers and a sister, one of the former of whom died—the one who had brought the remains from Glasgow;—and a servant girl having exhibited the premonitory symptoms,

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she was conveyed home to Carrington, a locality some eight or ten miles southward, hitherto unaffected.

"CASE I.—Janet Inglis, servant at Straiton, in the parish of Libberton, came home on the 8th January, labouring under symptoms of cholera. She recovered.

"CASE II.—Mrs. Inglis, her stepmother, was taken ill on 13th, and died on 14th. Nursed her stepdaughter during her illness.

"CASE III.—Mrs. Lyell, aunt of Janet Inglis, was in attendance on both the preceding cases. She was seized on the 16th, and died on 19th. Her house was next door to that of Mrs. Inglis.

"CASE IV. (and last.)—James Inglis, father of Janet Inglis, (Case I.,) husband of Mrs. Inglis, (Case II.,) and brother of Mrs. Lyell, (Case III.,) was seized on the 16th, and recovered.

"To the three sorites here succinctly given, I could add many more in my possession, connected with the recent re-introduction of cholera to Scotland from Hamburg. When, by the doctrine of chances, these are satisfactorily accounted for, the others shall be at the service of the public."

We conclude with the following quotation from Dr. Müller's Report:—

"On the 27th of May, the ship Ixion of Nicolajew, coming from an infected place, brought to Sevastopel several persons who had been attacked, among others an army surgeon Sp., who was removed to his own house. On the 29th, his servant was taken ill; on the 30th, his two daughters; on the 31st, a female relation who nursed him; and on the same day, her two children; upon this the disease spread more widely through the town.

"Wollhynian department. The priest M. was attacked in the beginning of June, soon after his return from Kiew,

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where the cholera prevailed, and died. A few days after, the woman who arranged the body was seized, and then her two children ; and so the disorder spread in Schitomir.

" In Luga, an employé, who came from Petersburgh, was the first person attacked.

" In St. Petersburgh, the first patient was a dean (on 4th June) who came from Novoi Ladoga, an infected place. The other early cases occurred on the great Neva ; they were boatmen in a wood boat from the infected district of Novgorod ; they were followed by two labourers belonging to another boat, next the ferrymen of the neighbourhood, and the labourers at the exchange. On the 7th June, occurred the first case among the inhabitants, in close proximity to the boats on the left bank of the Neva.

" At Jamburg, the first patients were eight labourers who had come from St. Petersburgh.

" At Rewal, also the first were two passengers who came from St. Petersburgh by the steamer of 24th June. Both of them died in the hospital, and thence the epidemic spread.

" At Riga, the widow P. was attacked on the 19th June, having come from St. Petersburgh by the steamer, and also a cook of Count Siewer's from the same place. Not till three days after did there occur other cases there, two of persons from the same neighbourhood."

We had intended giving some such examples from our own experience as we have just quoted, but we believe it is quite unnecessary, until at least the evidence afforded by these be got rid of in some way or other ; but we may state it as the opinion of almost all with whom we have conversed on the subject, and who have had opportunities of forming a correct judgment, that intercourse with those ill of cholera increases the liability to the disease ; and therefore that in Scotland the cholera is certainly contagious.

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Those who are the most unwilling to admit the contagiousness of cholera, allow its tendency to "localize" itself, as they term it. That is, if cholera once gains access to a house, then all the inmates of that house, and all who enter it, become liable to be attacked by the disease. The fact is undoubted, and we have seen many instances of it; sometimes after the lapse of two weeks the poison continued to act upon a new comer. This naturally suggests the question, Where does the poison dwell? The rooms are sometimes perfectly bare; not even are there bed-clothes to harbour the deadly and subtle power. The cholera does not seem to be readily conveyed by *fomes;* for it was observed that at the hemp and flax wharfs of Petersburgh, where wares were stored from many infected districts, the cholera did not appear any sooner than in other parts of the city.* Does it dwell in the atmosphere? That, we should think, must be frequently entirely renewed; for with a window, a door, and a fire, there must be a rapid and total change of air. We cannot say where this morbific force resides. We might say it haunted a house, and there is no reason in the nature of things why it might not continue to haunt it for years as well as weeks. This is conceivable, and if it actually were to occur, it might give a hint to the ingenious speculators about ghosts, who have recently sought to revive many forgotten stories, and to advance into a place in history and science what hitherto belonged to the region of fable alone. Admitting as proved, which we are far from believing, that in certain places certain individuals see apparitions, we might imagine the phenomenon to be thus accounted for. That the human body in certain conditions can emit an influence capable of affecting others, and yet only to be detected by a

* Document transmitted by Central Board of Health to the Privy Council, 1832.

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vital test, all must allow : and that this influence can dwell for weeks in a place, is also undoubtedly true. Suppose that a person is murdered, it is possible that in the terror and agony of his hour of horror he may generate a peculiar emanation from his person, which may linger in the place where the deed of death took place ; and it is equally possible that certain delicately organized individuals, alive to all the finest influences which affect the nervous systems of persons so constituted, on entering the chamber where this emanation is, may become morbidly affected, and the specific form of morbid action may be a spectral illusion. If all this be admitted, then we shall have a good clue to many ghost-stories ; and if it be not admitted, then we must be content to wait till the sun rises upon "the night side of nature." In the meantime, we would advise any of our readers who are interested in idle speculations of this kind to read a very ingenious and able article upon ghosts and ghost-seers which appeared in Number XVIII. of the North British Review.

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CHAPTER III.

ITS PATHOLOGY.

In this Chapter we propose to discuss the predisposing, exciting, and proximate causes, and morbid anatomy of cholera; reserving for the sequel the consideration of the symptoms or semeiology, as well as all that refers to the treatment or therapeutics of the disease.

By "predisposing causes" we mean all those conditions of the body, whether natural or acquired, which render it peculiarly liable to the influence of the exciting causes of the disease—as, for example, sex and starvation. By "exciting," all the causes external to the body which tend to give rise to this peculiar morbid action within it, as the state of the atmosphere, or intercourse with the infected; and lastly, by "proximate cause," the morbid action itself, which, if unchecked, necessarily goes on to produce all the phenomena of the disease.

The proximate cause is the first in a series of morbid actions. Without it there can be no cholera; but the subsequent changes in the system may or may not go on. These secondary morbid actions, which are produced by the first proximate cause, become themselves in their turn the proximate cause of a second series of phenomena. As it is of great consequence that we should have distinct ideas on this subject, we shall quote a paragraph from Fletcher's Pathology to the point:—

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"With respect to the admission of a proximate cause, there is much less approach to unanimity; and indeed the existence of such a cause is in the present day very generally, but, as it appears to us, very injudiciously questioned. In nine cases out of ten, a medical man, called on to define a proximate cause of a disease, will reply that he knows of no distinction between this cause and the disease itself, and that, in his view of the matter, the terms are synonymous. But this is to confound all distinction between what is often hidden and what is always manifest, and implies a very inadequate conception of what constitutes, strictly speaking, a disease. A disease is analogous to a healthy function; a proximate cause to the mechanism of that function. We may recognise the one without knowing anything about the other. If the discharge from the nostrils in catarrh, and the yellow colour of the skin and eyes in jaundice, be distinct respectively from an inflammation of the Schneiderian membrane, and an obstruction of the biliary ducts whence these symptoms proceed; if what a person, ignorant even of the existence of such a membrane, or such ducts, immediately perceives and recognises, be distinct from what a medical man arrives at only by study and observation; if, in a word, semeiology and pathology be distinct sciences, a disease is not identical with a proximate cause, but something resulting from it, and separated from it by a very distinct line of demarcation. It bears nearly the same relation to a proximate cause which a shadow does to the substance which produces it; and as the shadow is the immediate and evident effect of the interposition of this substance, so as to intercept the rays of light, whether the substance be obvious or not, so a disease is the immediate effect of its proximate cause, which, in like manner, may or may not be obvious; in other words, it is merely an abstract term, by which we signify

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certain phenomena, without any reference to their immediate origin."*

The terms "predisposing," "exciting," and "proximate," although technical in their character, and generally confined in their use to pathological language, express the conditions under which all complicated phenomena take place. For example, suppose a hay-stack burned down, and we were to investigate the various steps of the operation; suppose we ascertained that some miscreant had soaked one part with turpentine, and thus had rendered it more liable to catch fire—this would be the predisposing cause of its combustion. Then suppose the fellow had lighted a large fire of shavings to the windward of the stack, and that the wind, laden with burning embers, had blown upon that part which had been prepared by the turpentine to catch fire readily, we should call that the exciting cause. Let us observe that we have purposely chosen a mixed cause to illustrate the meaning of exciting cause. The wind without the embers might have blown till it blew the haystack away altogether, but would never have set it on fire; and the fire without the wind would have been as innocent as if it were in the bosom of Hecla. The wind and flame together combined to make the exciting cause. The exciting causes of disease are almost all of this character; and we often cannot analyze the component parts, which, by their mixture, make an exciting cause. The meeting of the exciting cause, the fiery wind, with the predisposing cause, the inflammable hay, give rise to the combustion. But where is the place for the proximate cause? Flames and combustion are not the same. The northern lights stream in flames along the sky where there is nothing to burn, and the flames of the will-of-the-wisp may be seen to play above the swamp, without at all

* Elements of General Pathology, pp. 3, 4.

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tending to dry it up, much less to set it on fire. The combustion of our haystack means that there has been a rapid union of the oxygen of the air with the carbon and hydrogen of the turpentine and hay. This chemical action, not cognizable by the senses, gives rise to the phenomenon of a brilliant light, attended with intense heat, which can be both seen and felt, and which, were we to carry out our illustration, would represent the disease as contradistinguished from its proximate cause.

To return from this digression to the consideration of the predisposing causes of cholera, the first that meets our eye is sex. According to the subjoined table, which corresponds in its results to the observations made at the Cholera Hospital in Edinburgh, the number of females attacked by the disease was nearly double the number of males. However, let us observe that this table also shows that the great majority of both the sexes were grown up, and the difference in the liability of the men and women to the disease may depend upon a difference in the habits, rather than be attributable to the sex alone. We are inclined to this opinion, for we find the relation of the sexes in reference to cholera to be reversed in other parts of the world, and it is hardly likely that climate could effect such a change if it were dependent upon sex alone. For woman's character, although still "*varium et mutabile semper*," seems to be essentially the most unchangeable thing in nature.

In India it appears that a larger proportion of women than of men were attacked by this disease. The proportion of males to females in the suburbs of Calcutta was, according to Mr. Jameson, as four to one; in some other places as two to one; and this observation is confirmed by Dr. Marshall in Ceylon, and Dr. Scott at Madras.* At Moscow,

* Orton, op. cit., p 454.

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according to a table given by Markus,* the number of men treated in the extraordinary hospitals and houses for the reception of patients generally, was 1724, and the number of women 909. This was exclusive of the military force, who had hospitals of their own.

The reason of the greater proportion of women to men who have taken cholera here, we naturally find in their having much more to do both with the dying and the dead. With a devotion characteristic of their sex, they are always found hanging over their sick friends, relatives, or neighbours, and it is women who arrange the bodies for interment. The difference in the number of the sexes attacked by the disease here thus becomes an argument in favour of its contagiousness.

In regard to age as a predisposing cause, it has been observed, that infants at the breast do not seem liable to the disease, which coincides with our own observations. In the following table will be found the results afforded by the cases treated at the Homœopathic Dispensary:—

TABLE SHOWING THE RELATION OF AGE AND SEX TO THE NUMBERS ATTACKED AND TO THE MORTALITY.

Age.	Number of Patients.			Deaths.			Recoveries.			Per Centage of Deaths.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Below 10 years	9	12	21	3	4	7	6	8	14	33 1/3	33 1/3	33 1/3
From 10 to 20	8	16	24	1	4	5	7	12	19	12 1/2	25	20 5/6
From 20 to 50	54	105	159	15	21	36	39	84	123	27 7/9	20	22 2/3 4/5
Above 50 years	13	19	32	5	4	9	8	15	23	38 6/13	21 1/19	28 1/8
Totals	84	152	236	24	33	57	60	119	179	28 4/7	21 7/33	24 9/19

The next predisposing causes we encounter are intemperance and destitution. With regard to the former, it has

* Op. Cit. Appendix.

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been too much the practice in dealing with this as with other points connected with the cholera, to sacrifice rigorous truth to didactic effort. Were we to believe some well-meaning, but one-ideaed persons, we should conclude that total abstinence from stimulants would be nothing short of the harbinger of the millennium—that the cholera, as well as most other diseases, was sent as a special scourge to drunkards, and that no quiet living, respectable member of a temperance society need be at all alarmed when the cry of cholera is raised. At the first glance this statement seems to be borne out by statistics, and the tables we subjoin go to its corroboration. But a more general consideration, and a more extensive survey of the whole subject, will greatly modify this conclusion. Let it be observed that intemperance implies many things—destitution, filth, a wretched dwelling, reckless exposure to disease, and improper food. We have seen a drunkard staggering over his dying wife, vainly attempting to raise her in the bed. That to these concomitants of drunkenness rather than to the state of the body directly produced by this hideous vice, are to be attributed the number of the intemperate who perish from cholera, seems proved by the simple fact, that in India the proportion attacked is in direct ratio to the poverty of the persons. It is a disease emphatically of the poor. This is well brought out in the following passage from Dr. Orton's able and interesting work :—

"The clearest and most striking general observation which occurs regarding the prevalence of the disease in different classes of people, is, that the higher ranks of society have been found in India to suffer less than the lower; and this seems to hold good through all its branches, military as well as civil, native and European. If we could divide the population of India on this principle into two classes, in the

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same manner as we have bisected the year, it is probable that we should find the less fortunate half affected in the same proportion to the rest, as are the six summer months compared with those in which the sun is on the other side of the line. Thus we constantly find that the officer suffers less than the soldier or the sepoy; that the superior description of troops, as the cavalry, &c., (who form the élite of the army,) suffer less than the infantry, and they again, greatly less than the hard-labouring and ill-fed camp follower. So also it is as constantly found that the brahmin (the supreme or priest-caste) and the sleek banian (merchant) suffer less than the ryot, who pays often as much as half the produce of his rice-fields to government for rent, and extorts from them a scanty subsistence under a burning sun; and still more remarkably less than the poor outcast pariah, who carries a burthen ten miles, and returns the next day empty-handed, for fivepence sterling.

"The greater prevalence of the disease among soldiers, both native and European, than their officers, has been from the first generally remarked. Thus during the first attack at Bellary, not an officer out of at least fifty at the station was attacked. In the severe attack of the 34th, not more than two slight cases occurred in a body of about thirty officers, whilst of the men, one in eight was admitted into hospital, and many died. In the first and very severe prevalence of the disease in the field-force in the Dooab, (General Pritzler's,) not more than two or three attacks occurred among the officers of the whole camp. In the Candeish field-force not one, though one of the corps suffered severely.

"In the centre division of the Bengal army, too, Mr. Jameson states:—'During the week in which the epidemic raged with so much fury, when the camp was a sick-ward, and every tent was filled or surrounded with the dead or

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dying, the officers suffered comparatively very little. From a number that could hardly have fallen short of three hundred, only five or six deaths occurred; and it should be remembered, that at this time officers of all descriptions were equally exposed with the medical men, for the sick had become so numerous, that even the services of all were insufficient to tend them with proper care, and duly administer the requisite remedies.' Mr. Marshall states, that in his experience (in Ceylon) the commissioned officers were entirely exempted.

"In this circumstance, however, there is nothing peculiar to cholera. Commissioned officers are generally much more healthy than at least European soldiers. This is particularly remarkable with regard to the dysentery, or the particular inflammation of the large intestines, which destroys probably at least one-half of the Europeans who die in India in ordinary times, and in those parts where malaria does not exist in any notable degree, a still larger proportion. From this disease officers are almost exempt, even when it is prevailing as a most virulent epidemic, as it often does in standing camps in hot weather. I have treated thousands of cases of it in soldiers, in these and all other usual situations, but never saw an officer die of it, and rarely a serious case, or an attack of it at all among them. This I have never ceased to wonder at, and in seeking its explanation, have sometimes been tempted to refer the disease to contagion. They are not so remarkably exempt from hepatitis. It is, however, chiefly referrible to the greater regularity of life of the officer; for though he takes a considerable portion of spirituous fluids, it is regularly and without inducing intoxication, whilst the soldier will be partially intoxicated for a week or two together; and then, having no longer the power of inducing that state—which is with him the *summum bo-*

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num, he reverts to his water-drinking till the next receipt of pay, or till he has hoarded up the means of renewing the excessive stimulus. The prospect of sickness, or even death, have no terrors for him to keep in check this inordinate appetite. And to this circumstance we must chiefly refer the greater prevalence of cholera in the European soldier than the officer. The former is sufficiently clothed and fed, and his frame is generally somewhat robust; there is, therefore, no predisponent debility to account for it. Other circumstances also, doubtless, contribute to produce the superior general healthiness of the officer, as his greater general care of his health and attention to its first derangements; and particularly the greater influence of mind, and the amusement which it creates; for ennui and inactivity of mind, as well as of body, are a great cause of disease, and nowhere so remarkably as in hot climates.

"The greater prevalence of the disease among the sepoys than their European officers, which is as remarkable as in the other case, is to be placed to another account. *They are perfectly temperate*, as are almost all the natives of India, but this temperance is with many of them perforce carried to excess. It is evident that the greater liability to this epidemic of the sepoy than his officer, and indeed of the natives in general, compared with the Europeans in India, is owing to a diet not sufficiently nutritious to ward off the attacks of a disease which is so eminently one of debility, although it is undoubtedly better calculated than ours to obviate the commoner form of Indian disease, pure inflammation. The pay of the sepoy is about fivepence per day, and on this most of them have families as well as themselves to maintain. Yet this is affluence compared with the situation of most of the inferior servants, grooms, tent-men, porters, &c., who receive not more than from half to two-thirds of that sum; and they

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again are objects of envy to others unemployed and still lower in the scale. Neither are the prices of the necessaries of life proportionably low. The general diet of the lower classes is rice or other grains, boiled whole or made into cakes, the insipidity of which is in some degree removed by a sort of thick soup composed of vegetables, and a great proportion of condiments; and this food is too often also deficient in quantity. No wonder therefore that we should find so abundant a predisposition to the disease existing among a people thus dieted, and that it should be so often excited into action by exposure to cold and moisture in their wretched huts, or the still more wretched substitutes for tents of the innumerable followers of a camp."

We have attempted in the following table to distinguish between the drunken and the destitute—that is to say, those registered as destitute and dirty were not drunken, although it may be presumed that the intemperate were for the most part neither cleanly nor well fed.

TABLE SHOWING THE HABITS AND CONDITION OF THE PATIENTS, AND THE EFFECT OF THESE CIRCUMSTANCES ON THE MORTALITY.

	Total.	Deaths.	Recoveries.	P. Cent. of Deaths.
HABITS :				
Temperate.....	183	38	145	20
Intemperate.....	53	19	34	35
CONDITION :				
Destitute and Dirty..	98	33	65	33
Comfortable.....	138	24	114	17

The return from the Cholera Hospital of Edinburgh does not altogether tally with this; but we must recollect that the great majority of those who go to an hospital are intemperate in their habits; and we should require to know the proportion of temperate to intemperate in the Royal Infir-

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mary, or some other larger hospital, before we could come to any legitimate conclusion upon the matter.

	Males.	Females.	Total.
Dissipated.....	37	39	76
Irregular.....	13	39	52
Doubtful	2	19	21
Sober.....	43	55	98
Unknown.....	1	0	1

The next predisposing cause we shall advert to is gastro-intestinal disorder, more especially diarrhœa. By the universal consent of all writers, there is a prevalence of diarrhœa about the time of the cholera epidemic. This derangement has been considered of so much importance by the Sanitary Commission, that they have gone the length of calling it the *first stage* of cholera. As this is a point of deep practical interest, lest we should in any way misstate the doctrines inculcated by the Commissioners, we shall quote at length from their Report :—

"The whole tenor of that evidence shows, that the premonitory symptom of an attack of Asiatic cholera is looseness of the bowels. This may be accompanied with pain in the bowels, or it may be entirely without pain. The looseness itself may vary from one to three, six or more additional evacuations daily. The evacuations at this period are generally fæcal, and of their natural colour and odour, altogether unlike the discharges at the more advanced stage, when they are rice-coloured, and without their natural odour. The pain, if any is present, consists merely of the sensation of griping or uneasiness in the bowels; but the discharges, even when accompanied by this uneasy sensation, produce so little inconvenience, that it is difficult to regard them as indications of illness, much less as the commencement of so terrible a malady. Yet this is the real beginning of the dis-

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ease, which consists of two stages—first, of this, the stage of simple diarrhœa; and secondly, of the stage of collapse, or blue stage, to which alone the name of the disease, Asiatic Cholera, is commonly applied, all the symptoms characteristic of the malady being present only in this stage.

"The first stage, or that of simple diarrhœa, may continue from a few hours to two, three, or more days. If proper remedies are employed at this period, the progress of the disease is generally and easily checked, and the second stage never comes on; but if neglected, the second stage commences suddenly, with all the violence which distinguishes this dreadful malady. But this suddenness is merely apparent; the disease has been actually present, and has been making progress several hours, perhaps days, and it is the second, the violent, the unmanageable, and mortal stage that has really come on suddenly.

"Any deviation, then, on the side of looseness, from the natural state of the bowels, during the prevalence of Asiatic cholera, is the real commencement of that disease; a single additional evacuation daily, beyond what is natural to the constitution, nay, even a looser state of the daily evacuation must, under such circumstances, be so regarded.

"Asiatic cholera appears to be caused by a poison diffused in the atmosphere, which acts with peculiar intensity on the mucous membrane of the alimentary canal. The irritation set up in this membrane, in most cases, is not violent at first; but if it be allowed to continue unchecked many hours, it produces such an extraordinary change in the membrane, that the thinner and colourless portion of the blood is poured out from it with the same rapidity as it would be if a large opening were made in the great vein of the arm.

"Mr. Hodgson of Birmingham, who has paid great attention to this subject, and who on his examination drew our

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attention in a special manner to the important consideration of the means by which cholera may be arrested in its first or premonitory stage, speaking of persons in the second stage, says :—

"'The immense discharge of serum from the blood reduces them to such a degree that they rarely rally. To expect them to rally is like expecting a patient to rally in whom a great blood-vessel has been opened, and from whom nearly all the blood of the body has been drained: the material of life has been taken away to such an extent that few only can sustain it.'

"The view which we have now presented, of the importance of attending to the very first stage of this process, the commencement of which is indicated by any increase beyond the natural discharge from the alimentary canal, is in perfect accordance with Indian opinion and practice.

"'It is,' says Dr. Parkes, 'the universal practice in the Indian army, immediately on the occurrence of cases of cholera, to issue orders directing the attention of the non-commissioned officers and men to the importance of attending to any deviation from the ordinary health, and particularly to any symptom of bowel complaint; and it is a positive order that any man so affected should report himself sick. It is always found that many men at such times do, in accordance with this order, report themselves sick, proving the prevalence of such complaints. Many men, however, do not conform to this order, the affection being often so slight and so entirely without pain, that they cannot be induced to regard so apparently trifling an ailment as disease; hence of the men admitted into hospital, many when seen for the first time present the developed stage of the disease. In the great majority of cases, there can be no doubt that this first stage indicated by this premonitory symptom does

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existed. I witnessed two epidemics, the first, the slightest, in which the premonitory symptom was almost universal. In the second, the disease was more rapid, and appeared in some cases to present itself at once in its developed stage. These cases, however, even in India, appear to form an exceedingly small minority.

"'With regard to the duration of the premonitory stage in India, I do not think I ever myself witnessed a case in which the diarrhœa had existed longer than four days, and the usual time would in general be only a few hours; that, however, would afford sufficient time for the application of remedies, capable, in the great majority of cases, of preventing the further progress of the disease.'

"The opinion and practice of Russian physicians at the present time are in perfect accordance with their views. In all the accounts that we have recently received, the medical men who are treating the epidemic which is now prevailing, first and prominently urge, 'THAT THE GREATEST ATTENTION MUST BE PAID TO THE DIARRHŒA,' which they say, 'PRECEDES CHOLERA.'

"From advices which we have just received from Constantinople, we learn that diarrhœa was prevalent and severe in Trebizond during the whole month of August, before cholera broke out in its Asiatic form early in September, and that in those persons in whom the disease advanced to this latter stage, diarrhœa was an early and prominent symptom.

"It is notorious that diarrhœa was extremely prevalent in all the towns of the United Kingdom in which Asiatic cholera broke out in 1832, though at that time the observation had not been clearly and generally made that it constantly precedes an attack, and is in fact the actual commencement of the disease. In the detailed accounts of par-

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ticular cases occasionally transmitted from the Local Boards to the Central Board of Health, constant mention is made of the presence of diarrhœa, often two or three days before the violent attack came on. But, perhaps, one of the most interesting and instructive illustrations of the extent to which this premonitory system is present in a population in which cholera is prevalent, is afforded by the remarkable history of the progress and termination of this epidemic at Bilston and the neighbouring district in 1832. This pestilence raged in Bilston with greater violence than in any other part of the United Kingdom. Out of 14,700 inhabitants, 3568 were attacked with cholera, out of whom 792 died in less than seven weeks; that is, one-fourth of the whole population were subjects of the disease, and one-fifth part of those attacked died.

"The Rev. William Leigh, the enlightened and benevolent clergyman of Bilston, whose exertions to mitigate the sufferings of his parishioners during this melancholy visitation were most exemplary and indefatigable, gives the following description of their condition:—

"'The pestilence,' he says, 'continues its ravages amongst us in a frightful manner. Our necessities are increasing every hour, and our resources are fast failing us. Three hundred pounds have been granted to the Board of Health out of the poor-rates; but this sum will not pay for the coffins of the dead. All kind of business is at a stand. Nothing reigns here but want and disease—death and desolation. Two of our medical men have perished; two more have left the place to recruit their exhausted strength; and my respectable neighbours are nearly worn out by mental anxiety and exertion. I have been confined to my house since last Thursday, and nearly the whole of that time to my bed.'

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"In this extremity, the inhabitants applied to the Privy Council for medical aid, and Dr. M'Cann, who had seen much of cholera in India, was sent to their relief. The first thing he did was to open a dispensary, to secure the attendance of medical men there night and day, and to placard the town with notices, that whoever was attacked with looseness of the bowels, might receive gratuitously, at this institution, instant advice and relief. Two assistant surgeons, paid by the Board of Health, were in constant attendance, and the resident surgeons of the town, three in number, undertook to visit the institution daily at regular intervals. The dispensary was opened on the 26th of August; on the following day, 270 persons applied for relief for bowel complaints; and in the course of eight days, the number increased to 1100, all of whom, on their personal application, received the appropriate remedies for such complaints at the institution. The effect was most striking; for it appears from the official Report of Dr. M'Cann, that in the course of a single week, the mortality was reduced one-half.

"'I have,' he says, 'the satisfaction to state, that the mortality in Bilston parish from cholera has been reduced during the last week to less than one-half what it was during the preceding; the number of deaths from that disease during those two periods respectively, as taken from the burial registers, has been as follows:—

"'From 20th to 26th August, . . 275

"'From 27th August to 2d September, . 132

"'For this happy change, and happy it is comparatively, we are, I have no doubt, mainly indebted to the beneficial influence of the Public Dispensary for the Bowel Complaints, upwards of 1100 personal applications having been made and attended to at that institution, for such affections, during the last eight days. From this fact, the public may

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