REMARKS ON THE EPIDEMIC OF CHOLERA IN EGYPT.

Read before the Epidemiological Society.

By W. G. HUNTER, M.D.,
Retired Surgeon-General Indian Army.

MR. PRESIDENT, AND GENTLEMEN,—When, sir, you did me the honour to invite me to read a paper having for its subject the late cholera-epidemic in Egypt, I had some diffidence in responding to your request, as I felt that, after my report had been presented to Her Majesty's Government, anything that I might have to say would be robbed of much of its interest. On reconsideration, however, of the matter, there appeared to me one particular point in that report of such paramount importance that it could scarcely fail to prove of interest to this Society, even if much of the old ground were travelled over again.

Having received, too, since the report was written, further corroborative testimony of my views on the origin of the epidemic in Egypt, I thought I might venture to place the matter before you. While this paper, therefore, has no pretensions to being a comprehensive one on the cholera-outbreak of 1883 in Egypt, but will be strictly limited to an endeavour to explain the origin of the outbreak, yet it will not, I trust, fail in creating an interest among the members of the Society. If it does this, it will have served the purpose for which it was written.

Egypt is a very extensive country. It extends from the Mediterranean Sea to the Equator. It is not, however, this vast country which has been the scene of the recent epidemic of cholera, but rather Egypt proper, which includes the Delta and Upper Egypt as high as Asuan on the first Cataract. Its area of cultivated land is not larger than Belgium. Its population, however, according to the most recent census (1882), amounts to 6,798,280; and is, consequently, about one and a quarter millions in excess of that of Belgium. The soil, which is very fertile, is an alluvium, "the gift of the Nile," and is rich in decomposing organic matter. The people are essentially agriculturists, and lead an out-door life. Manufactories, though increasing, are comparatively few. It is almost a rainless country. At Alexandria, it is true, the average annual rainfall for the last four years has been about eight inches; but in the interior, of which Cairo may be taken as representative, the rain is limited to a few showers, which fall during the cold months of the year—viz., in November, December, and January. The sky is generally cloudless, the air dry, and the dews very heavy. The prevailing winds are northerly, a southerly wind being quite exceptional. On looking over the meteorological reports, issued from the Khedivial Laboratory, one is struck by the almost tedious monotony with which the northerly winds blow throughout the year.

The rainfall being so scanty, the country is consequently dependent on the Nile for its water-supply. The river is subject to periodical inundations, owing to the heavy rains in the equatorial region. The rise of the river at Cairo begins about the end of June, and is at its highest about the middle of September, when it gradually falls until it again attains its minimum level in June. There being practically no rain, the subsoil water-levels must necessarily follow the Nile level; that is to say, be at their lowest in June, and at their highest in September.

The larger majority of the people drink the water unfiltered, and generally before it has been allowed time to deposit. It is said that they prefer it in this condition. In Cairo the quality of the water-supply is indifferent. At the waterworks there is but one settling tank, and, as it is in constant use, it can never be cleaned.

The large amount of mineral matter contained in Nile water, while settling, carries down with it no inconsiderable quantity of the organic substances held in suspension in the water, and must lead to rapid fouling of the tank. Filtration is effected by gravel and sand. In the Ismailia quarter, that is, the fashionable part of the city, and in the Boulac quarter also, no attempt is made to filter the water, but it is supplied as obtained from the Nile. Close to the intakes of the Cairo waterworks, where some slight efforts, it is presumed, would be made to prevent pollution of the water, I have seen human, and other animal excreta, fresh and stale, lying about in various directions, and men and women bathing, and washing their soiled clothes in the river. This was by no means an uncommon sight.

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The water supplied to Alexandria is, on the contrary, of very good quality. The system, though much the same as in use at Cairo, is carried out in a much more efficient and thorough manner. Alexandria is the only town in Egypt which possesses a wholesome supply of water.

The river and the soil have been polluted through countless generations, and the alluvium is almost as absorbent as a sponge. Wherever there is water, it is scarcely too much to say, you may feel assured it has been fouled by man. The river is, I may say, polluted and fouled almost from its source. It is the means by which filth, garbage, and dead animals of every description, are disposed of. Every town and every village situated on its banks add their quota to the fouling of the stream, until at length, when it has reached its lowest level in June, it is found, as at Cairo and at Damietta, to be undergoing putrefactive changes; to present under the microscope the character of pond-water rather than of a running stream, and to contain bacterioid organisms in considerable quantities.

For a detailed description, chemical and microscopic, of the character of the water at Cairo and Damietta, in June 1883, I would beg to refer the members of the Society to my second and third reports to Her Majesty's Government on the recent epidemic in Egypt. Mr. Ismailum, Director of the Khedivial Laboratory at Cairo, and Dr. Sonsino, in their report state that, after July 20th, bacterioid bodies were no longer found in the water.

As a specimen of the quality of the water used by the villages in Egypt, I would, in passing, call attention to a report made to me by Mr. Honman, one of the twelve medical gentlemen sent to Egypt by Her Majesty's Government for service during the epidemic. This gentleman was in charge of Mehallet-el-Kibir, a town of about 28,000 inhabitants, situated to the north of Tanta, midway between the Rosetta and Damietta branches of the river. Mr. Honman states in his letter, dated August 30th, 1883: "The town has three mosques; the drain from one running through the town, quite open and with three feet of filth at the bottom. This discharges itself into a pool of water at the back of the town, which is used by the people for domestic purposes, and as drinking water for their cattle. The other two mosques drain in a like manner into pools outside the town, and they also are used by cattle and for domestic purposes. The stench from these drains can be smelt all over the town."

During the past year, the water-ways were more than ordinarily polluted by carcasses of cattle which had died of typhus being thrown into them, in order to evade a tax of five francs per head for their burial, which the poverty-stricken fellaheen were quite unequal to pay. It is notorious that many of the fellaheen were reduced to such straits as to be forced to feed on the carcasses of cattle which had died in this way. The number of carcasses and portions of carcasses in a far advanced state of decomposition removed from the Damietta branch of the river amounted to upwards of 1,500, a number considerable in itself, but insignificant as compared with the thousands which must have been thrown into the river. The losses in cattle occasioned by the "epizootic" weighed heavily on the fellaheen, and reduced them to strange and curious expedients to till the soil.

The villages are collections of mud-hovels, in which, with the human family, reside all their domestic animals, as pigeons, fowls, asses, goats, and perhaps a camel. In no towns, so far as I know, are there public latrines, except those belonging to the mosques, which are quite inadequate to meet the wants of the people, who are driven to the streets, gullies, and open spaces for natural purposes. This remark applies equally to cities like Cairo and Alexandria.

I must here for a moment interrupt my narrative in order to pay a passing tribute to the valuable sanitary work effected by the Executive Commissions which the exigencies of the times called into existence at Cairo and Alexandria. Shortly after the epidemic ceased in the Delta, these commissions were dissolved, with a result that might have been foreseen; grossly unsanitary conditions again became rife, and have justly called forth from Mr. Clifford Lloyd the severest reflections on the Health-Inspector of Alexandria, and the Conseil de Santé at Cairo.

In Cairo, the cess-pit system exists, and is carried out in a very inefficient manner. Many of the pits are holes dug in the sand, which have never been emptied or cleaned. More recently, in the better class of houses, the pits have been better constructed, but their being emptied depends much on "the caprice of the landlord, not of the tenant." The wooden carts employed for removal of the sewage are of the most primitive description, and numerically are

quite insufficient for the purpose. Consequent on there being no break of connection, the house-pipe and the cess-pits are in direct communication one with another.

In Alexandria, an attempt has been made to establish a sewerage system, but, as in most things Egyptian, a very defective one. In the first place, it is but partial; in the second, it possesses radical defects of construction, and the outlets, some twelve or more in number, pour their contents on to the beach directly to windward of the city. The sewers are, moreover, unventilated, such ventilators as existed having been sealed up about five years previous to my visit in August last. The privies of the houses are in direct communication with the sewers.

I might point to numerous other unsanitary conditions, not in Alexandria and Cairo only, but in the country generally, but refrain from doing so for fear of wearying the members of the Society. It will be sufficient to say that grossly unsanitary conditions abound everywhere, and there can be little doubt that, from their Sanitary Department, the Egyptian Government have received but scant service. It is, to me, a source of much satisfaction to know that the Conseil de Santé has been abolished, to be, I trust, replaced by an executive which will not be neglectful of its duties to the country and the people. Under such conditions as I have above faintly endeavoured to describe, it is hardly matter of surprise that bowel-disorders should be very common and very fatal, and zymotic diseases very prevalent. Visit what hospital or village one may, one is struck by reports of the prevalence and fatality of diarrhoea, enteric fever, and other intestinal disorders. And that, under the head of diarrhoea, numerous deaths from cholera lie hidden, I shall proceed to show further on, from evidence supplied to me by others, as competent as myself to form an opinion on the subject. Registration of disease is notoriously defective in the smaller towns and villages in Egypt. It is generally not until after death, when it may perhaps be necessary to obtain a permit for burial, that any attempt is made to ascertain the cause of death, and even then, as a rule, it is as often guessed at as not. Although the system be highly defective, yet it must not be lost sight of that all the returns and reports agree on the prevalence and fatality of disorders of the bowels. Samanood and Shibin-el-Koom were two towns among others which I visited while in Egypt. At the former, from the 1st to the 30th June, 1883, out of 40 deaths from all causes, 26 were from diarrhoea. At the latter, out of a total of 174 deaths in May, June, and July, 1882, 93 were from diarrhoea; in May and June, 1883, out of a total of 110, no fewer than 57 were from diarrhoea. In Cairo, where registration, though far from perfect, is more reliable than in the smaller towns and villages, the mortuary-returns show a very high death-rate resulting from bowel-disorders. The members will observe, from the mortuary-tables of that city for 1881 and 1882 which are placed before them, that in the former year, out of a total death-rate of 14,579, or 39.67 *per mille*, there were 1,097 deaths from gastric and typhoid fever, or 7.5 *per cent.*; 1,889 from dysentery, or 12.9 *per cent.*; 1,902 from gastric catarrh, or 13½ *per cent.*; that in the latter year (1882), out of a total death-rate of 17,290, or 46.98 *per mille*, the death-rate from the same causes was 10 *per cent.*, 13½ *per cent.*, and 15 *per cent.* respectively—a startling mortality as compared with a city like Bombay, for example, where the death-rate from all causes for 1881 amounted to 27.87 *per mille*, and from bowel-complaints a rate of 2.59 *per mille*.

Typhus fever is far from being uncommon, and in 1883, I have reason to believe, prevailed to some extent in the towns and villages of the Delta. In the returns for Cairo for the years 1881 and 1882, previously referred to, thirty-five and forty-six deaths respectively are registered from this cause. Little aid need be looked for from examination of the hospital-registers of the smaller towns and villages, as, in the majority of instances, the medical officers are incapable of differentiating between the typhus and typhoid types of fever; and, under the latter heading, many examples of the former would not unlikely be found.

The recent war, too, not improbably exercised a certain influence in the general insalubrity of the country. Relatively, however, to other existing conditions, this influence could not have been considerable. The campaign was a very short one; its main operations were conducted in the desert—between Ismailieh and the Delta—outside, as it were, of the country. The men composing the "Indian Division of the Egypt Expeditionary Force" were a picked body; and Deputy Surgeon-General Colvin Smith, C.B., principal medical officer with the force, in his report of the expedition, states that the fighting men and followers were "remarkably healthy;" that it was not until they had been resident in Cairo, that their health began to suffer from diseases common to the country, as diarrhoea and enteric

fever, both of which diseases he seems to regard as endemic in that city. From diarrhoea, he states, almost every officer suffered while at Cairo, and some very severely.

There have been in Egypt, since 1831, no fewer than five epidemics of cholera, exclusive of that of 1883. The first broke out in July, 1831; the second on June 24th, 1848; the third on July 25th, 1850; the fourth on June 24th, 1855; the fifth on June 11th, 1865. The last, according to official reports, claimed 61,192 victims—a number, I imagine, much understated, unless registration was more efficient then than it was during last year.

I am, I regret to say, unable to give the loss in population caused by the recent epidemic, as the returns have not yet been made up. The authorities are waiting until the disease has, I presume, ceased to exist. Now, however, that public attention has been directed to the matter, I fear some considerable time must elapse ere the report be published. The disease clings to the country—"hæret lateri letalis arundo"—even as in years gone by; but its presence now is recognised and acknowledged—a marked advance in sanitary politics in Egypt, and it is to be hoped of good augury for the future. Better far an open enemy, whose attacks can be met, than a hidden foe, who, invisible, deals his death-blows with an unsparing hand, and creates a wail through the length and breadth of the land.

Having thus, gentlemen, however imperfectly, and in as concise a manner as possible, endeavoured to lay before you the chief physical features of the country, its grossly unsanitary conditions, and its more prevalent diseases, I think it will be admitted that never was a country more ripe for an outbreak of epidemic disease, such as cholera, than Egypt; and yet Egypt itself was apparently astounded when it was announced that cholera, or plague, had broken out at Damietta on June 22nd, 1883. Immediately the report reached Cairo, a Commission was deputed to investigate the matter. The Commission arrived at Damietta on June 24th, and reported that the disease was cholera, but found it impossible to come to any conclusion as to its genesis. "La Commission se trouve dans l'impossibilité d'établir la genèse du choléra-épidémique de Damiette."

Dr. Flood, Physician to the Hospital at Port Said, believed (Drs. Chaffey Bey and Ferrari state in their report, to be referred to presently) that he had found the key to the enigma, and reported on July 5th to Salim Pacha, the President of the Conseil de Santé, that the disease had been imported by Mohamed Halifa, a stoker belonging to the *Timor*. This statement of Dr. Flood's has justly come to be looked on as incorrect, and, shortly after it was put forward, was effectually disposed of in a telegram from Sir E. Malet to Her Majesty's Government, dated Cairo, July 11th, 1883, which was as follows.

"Mohamed Halifa, for some years inhabitant of Port Said, shipped as fireman on board steamer *Timor*. Made voyage to Bombay, returning 18th ultimo; all on board in perfect health. Obtained discharge at Port Said, and commenced course of drunkenness and excess. This continued four days, when he was imprisoned by governor of Port Said, and finally expelled by that official on 23rd ultimo, and arrived at Damietta on 24th, when he recommenced same course of excess on 25th. He is now at liberty, and apparently in perfect health. This disposes of theory, as epidemic broke out at Damietta on 22nd."

The next inquiry into the origin of the epidemic was carried out, under the instructions of the Quarantine Board, by Dr. Ahmet Chaffey Bey and Dr. Salvatore Ferrari; they are both medical officers of experience and of high standing in their profession. Their report is dated Damietta, July 24th, 1883, and will be found, *in extenso*, in my second report to Her Majesty's Government. These two gentlemen, firmly convinced of the importation of the disease, expected to obtain a confirmation of their views. Instead of this, after careful and patient investigation, they were forced to the conclusion that the disease had not been imported, and that there existed, in the deplorable unsanitary condition of Damietta itself, sufficient cause, in their opinion, for the origin and development of the disease.

Its importation into the country has also, I believe, been assigned to the Indian contingent during the war. I have, however, never yet seen this hypothesis formulated. This absurd opinion would seem to have had its origin in the representation made by M. Fauvel, Inspector-General of Sanitary Services under the French Government, of the danger which he conceived would arise to the French troops, which it was then expected would be sent to Egypt, from their association with the troops coming from India. As the contingency happily never occurred, it is not possible to say whether M. Fauvel's doleful foreboding would have been realised or not. Whether this opinion of M. Fauvel's had been

twisted to serve the purposes of those who believe in the importation of the disease into Egypt, I am scarcely prepared to say. Be that as it may, the subject has been allowed to drop.

The last importation theory which has been advanced, is one by Dr. Mahé, delegate of the French Government, viz., that it has been introduced by coal-trimmers and stokers employed on board steamers running between Bombay and Port Said. The ingenuity and vagueness of this allegation will be at once apparent. The subject is being investigated by Her Majesty's Government. The inquiry is likely to be a protracted one; but that Dr. Mahé's views will share the fate of those which have preceded them, I, for one, cannot for a moment doubt. The necessity for any investigation seems to me doubtful, considering that conditions already existed in abundance in the country itself to account for the origin and diffusion of the epidemic, not in the Delta alone, but also in towns and villages in Upper Egypt, far removed from the line of traffic between Egypt and India. Dr. Couvidon, a French physician resident at Port Said, in a report addressed to the French consul, dated August 1st, 1883, says it is not easy to determine the precise motives, either individual or general, which attribute the epidemic to importation. Be that as it may, the fact remains that nameless Bombay merchants and phantom-ships full of merchandise, have been conjured up, and are said to have brought the cholera from India to Damietta direct, without leaving any trace behind them at Suez and Zagazig: "I affirm and I prove that the present epidemic cannot have been imported." In the preface to his report, Dr. Couvidon says he bases his opinion on numerous thoughtful observations made during eighteen years' residence at Port Said.

A writer in the BRITISH MEDICAL JOURNAL of August 11th, 1883, states:

"Moreover, cholera has never been shown to have been imported from the Indies to Egypt, or to Europe. It is not, of course, denied that cholera occurs on board ship; but the tendency is to its spontaneous disappearance during a voyage. As the Sanitary Commissioner with the Government of India has remarked that, since 1865, Egypt has not suffered once until now; Aden, which is still nearer to India, has never suffered to any extent. Only twice since 1865 has there been a slight outbreak there.

"But cholera has prevailed in different parts of Europe in ten different years since 1865. It is endemic in parts of the Russian empire, yet no alarm is expressed by other countries.

"The English sailing-vessels, the *Persia* and the *North Wind*, are often loosely quoted as having introduced cholera from the Indies into Jeddah in 1865. They sailed from Singapore with Javanese pilgrims, touching at Alepe on the Malabar coast, and at Makallah on the southern coast of Arabia, and arrived at Jeddah. The voyage in one case was about fifty days, and in the other about eighty. There was no cholera among the pilgrims until the vessels were anchored at Makallah, where new passengers were shipped. Cholera was prevalent during the early part of the year in various towns on the Hadramaut coast, and it is reasonable to suppose that Jeddah became infected by the cholera creeping along the land. But in no case can the disease be proved to have been imported from India; and, in every alleged instance of such importation, the allegation has failed to bear examination."

Further, on examination of the returns of cholera for Bombay, it is shown that during 1882 a total of 192 deaths occurred, as against 529 in 1881; and that 120 deaths were registered during the first six months of the present year. Consequently, Bombay, against which complaint has been chiefly made, had been, during the eighteen months preceding the epidemic in Egypt, more free from cholera than usual.

Being of those who do not believe in the contagiousness of cholera, and who, therefore, do not look for a specific entity or germ, and its importation into a country to account for the development and spread of the disease, I turned my attention to the country itself in search for a cause of the epidemic outbreak, and, after careful and cautious inquiry, come to the conclusion that the epidemic of 1883 was the outcome of the disease which existed endemically in the country. The evidence in support of this statement I shall now proceed to lay before the members of this Society. Previously to going on a tour of inspection into the Delta, it was intimated to me that cases of cholera had occurred in a Greek school at Damietta before the outbreak on June 22nd. On arrival at Damietta I tested the truth of this statement, and came across the following cases.

1. Two Coptic priests (named Sadarros Yusuf and Gergis Hanna), after being carefully interrogated, informed me that a Coptic boy, named Hanna Gergis, aged 5 years, belonging to their school, had died of all the symptoms of cholera on June 17th.

2. A Greek priest, Michael Herodiades, whose statement was corroborated by the deacon at the Greek school, said that last May one of their scholars, Anton Nicolaides, aged 8 years, was attacked at Damietta with excessive vomiting and prostration, but had no purging. The priest could give no details as to the suppression of urine. The lad was taken by his mother to Mansourah, where he died in twenty-four hours.

At Shirbeen I accidentally met with Dr. Dutrieux, a medical practitioner of Alexandria, who was employed by His Excellency Shereef Pasha in making inquiries into the cause and origin of the epidemic, and, on discussing the question, I discovered that his investigations had led him to conclusions similar to my own.

Shortly after my return to Cairo, I received the following telegram from him, dated the 13th instant: "I have been to Feraskor to get serious information as to date of cholera at Damietta; returned to Damietta expressly to verify. Have received declarations in five cases. Two Greek children died April 27th; one day's illness, cyanosis, aphony, algid state, no vomiting, no diarrhoea. Another Greek child, ill about six months; vomit, cramps, aphony, algid state, without diarrhoea; death after six days. Arab barber, ill two or three days, towards end of April, died after vomit and diarrhoea. Arab shopkeeper, dead after twenty-four hours' vomit and diarrhoea. These facts are positive.—DUTRIEUX."

On my return to Cairo from tour of inspection, Dr. Sonsino informed me that he had received a letter from Dr. Ambrogi, who was then absent in Italy, in which he drew attention to a case of cholera which had come under his observation in Cairo. Dr. Ambrogi stated, "I am not quite sure of the year, but I believe it was in 1867 that I saw a case in the person of Dr. Giovanni Martini, who, being called out at night to an accouchement, wrapped himself up in a woollen scarf, which he said he had used only during the epidemic of 1865. A few hours later he was seized with fainting, then with vomiting and diarrhoea, and had all the phenomena of cholera with the algid state and aphony, but recovered."

Dr. Sonsino supplied me with the following instances which he had met with in his practice in Cairo. "Tomaso Bonassi, of Leghorn, lapidary, was seized with cholera on May 13th, 1873, and suffered from diarrhoea, vomit, algid state, and sunkenness of the eye-cavities. He recovered after twenty hours. In November 1874, the same man, while an invalid from an abscess in the abdominal wall, was again attacked with cholera, much more severely than the first time, but recovered, and is now in good health."

Dr. Rabitsch, in a memorandum dated Cairo, September 19th, 1883, states that "on a summer afternoon in the year 1878 or 1879, he was called hastily to a patient in the Hotel du Mercure, and found there a man whom he pronounced to be suffering from cholera; there being no epidemic in the country, he stated that there was no fear either for the patient or for the persons present; the patient recovered."

Dr. Fouquet, in a letter addressed to Mr. Albert Ismailun, Director of the Meteorological Khedivial Laboratory at Cairo, states that "he had under his observation in September 1881, a very grave case of cholera nostras, which closely resembled Asiatic cholera; the patient recovered."

Dr. Sierra, a medical officer of the European Hospital at Alexandria, in a letter to Dr. Sonsino dated Alexandria, July 31st, 1883, says: "I have no written notes wherefrom to answer your question; I must trust to my memory; but I am sure that what I remember and shall tell you, I remember well. After the small epidemic of 1866, I sometimes saw cases of cholera in Alexandria. I do not remember having attended to such cases all through the year, but I certainly saw some during the summer. During summer, and especially in the season of water-melons and fruit, it is common enough to have cases of gastric disorder; pains in the stomach, diarrhoea, and vomiting have always been very frequent in that season, and especially among the lower orders; but I do not call this cholera. By cholera, I mean a copious vomiting and diarrhoea, accompanied by a marked fall in the pulse, agitation, sinking of the eyes. Without, however, being able to fix the exact date, I remember having seen a Jewess with these symptoms where they lasted more than eighteen hours, and where the reaction was very difficult to bring about. I also remember that when I had such a case in my practice and mentioned it to a colleague, I was told that similar cases had occurred in the town; but never more than two or three cases in a year. I never saw any cases of sporadic cholera—cholera nostras. I have lately questioned some doctors of the town, and have been told that a few congeneric cases have been noted by them also. In the European hospital, two cases were admitted in May, which the sisters told me showed choleraic symptoms. One of these died, the other

was cured; he is now in the hospital with other ailments. These are the facts which have come under my observation."

When visiting the European Hospital, at Alexandria, I had the satisfaction of meeting Dr. Sierra, and he very kindly placed me in the way of obtaining the required information, and subsequently furnished me with the details of the cases.

One case was admitted, under Professor Fougeron, on June 5th, 1882, and recovered; the other case, under the care of Professor Courtier, on April 17th, 1883, and ended fatally.

These cases are designated as "choleric form." Dr. Mackie has, however, to my thinking, more correctly described them as two typical cases of cholera. Dr. Mackie, at my suggestion, kindly made further inquiries, and obtained from several medical gentlemen, practising in Alexandria, statements of cases which had come under their personal observation. To Dr. Mackie, himself, I am indebted for notes of four cases which fell under his own observation. Two in the summer of 1881; another in the summer of 1872, which ended fatally; a fourth in the summer of 1872 or 1873, in one of the sisters of the Deaconesses' Hospital.

Dr. Kartulis furnishes a suspicious case as having occurred in September 1881.

Dr. Mamlouk, in his letter dated August 27th, 1883, mentions two cases—one of a suspicious character, which had occurred about eight years previously; another, a typical case of cholera, about four years previously.

Dr. De Castro, in his letter to Dr. Mackie, dated September 5th, states that in 1866 he observed several cases of cholera, which he considered as a residue of the epidemic of the previous year, and he observed that new comers were more susceptible than the residents. Six or seven years ago he saw a case which recovered. About three years previously a case came under his observation and recovered. This patient had had a former attack in 1865. The second attack resembled the first, and presented all the phenomena of cholera.

Another case he had under his care two years previously, in a woman who had arrived the preceding day from Naples. It ended fatally.

Another case occurred in September 1882, in the captain of a ship recently arrived from Italy.

Dr. De Castro considers these to be cases of sporadic cholera, of which similar examples may be seen in the large towns of Europe; that they resemble cases of Indian cholera, but differ from them in being less grave, less fatal, and by their non-tendency to propagate themselves even in the absence of all sanitary precautions.

Dr. Demech states in his letter, dated Alexandria, September 3rd, 1883, that there had been an outbreak of cholera in Upper Egypt, which came from the Soudan, through Dongola and Wady Halfa, reaching Korosko in November, 1872. He states that, since 1865, not a summer passed without his seeing one or two cases, more or less severe, of cholera nostras, but in 1866 he had two fatal cases in Europeans in Mansourah.

This concludes the information I obtained on this highly important subject from medical practitioners in Alexandria.

On my return to Cairo, and since my arrival in England, I have received further evidence bearing on this matter.

Dr. Fouquet, in a letter addressed to Mr. Albert Ismailun, Director of the Meteorological Observatory at Cairo, which letter the latter gentleman has kindly forwarded me, states that he had under his observation, in September, 1881, a very grave case of cholera nostras, which closely resembled Asiatic cholera. The patient recovered.

Dr. Haddad, in a highly interesting communication, dated Assiout, September 5th, 1883, which he has favoured me with, shows that diarrhoea has been a frequent disease for many years past. He adds that Dr. Mazarakis, in December, 1882, had a patient who died with symptoms of vomiting, purging, cramps, and collapse, after ten or twelve hours. He states that diarrhoea has been a very frequent disease every summer, and that the Government registers show the mortality from this disease to be very great, being as much as one-third of the mortality from all other diseases combined.

At Assiout, Dr. Haddad states that a man who arrived from Cairo on July 28th, when the epidemic was at its height, and who died of cholera the following day, was entered in the Government registers under the head of "Choleric form." The inhabitants of Assiout "laughed" at this being considered the first case of cholera which had occurred there.

The presence of cholera in Assiout is not recognised in the Government register until July 31st, when two cases are recorded.

Further, Dr. Haddad gives it as his opinion that cholera was not

imported from Lower Egypt, even supposing importation ever occurred. He concludes by saying: "How many years it has existed here I cannot say, as I have neither the means nor the time to institute proper inquiries."

I had arranged with Dr. Haddad to investigate this matter, but, as I was leaving the country, I deemed it undesirable to allow him to do so. Dr. Haddad, being an able man, and a cautious and careful observer, and possessing a thorough knowledge of Arabic, was eminently qualified for such work.

If the report of Dr. Haddad be considered side by side with the letter from Dr. Demech, and the statement of M. Chevalier to Surgeon-Major McNally—"that cholera had existed in the Fayoum (Upper Egypt) six years ago"—I think it will be admitted that there are some grounds for the belief that cholera has existed in Upper Egypt since 1872.

I have next to draw attention to a letter from Dr. Patterson, Her Majesty's Consular Surgeon, Constantinople, dated Constantinople, September 24th, 1883, in which he states that he practised for thirteen years in Egypt, from 1855 to 1868, both in Cairo and Alexandria. Dr. Patterson states that he was well-acquainted with the large districts between Kafr and Zayat and Suez, and also the districts of Mansourah, Zagazig, and other places where cholera has recently prevailed. He affirms that he cannot recall a year during that time without several well marked cases of cholera having come under his notice, and which were conveniently classed under the head of "Cholera Nostras."

Further on, he says that no one acquainted with the disease could doubt that cholera—by whatever name it might be designated—was endemic in Egypt.

Again, he says: "Every year, at that time, there was a cholera-panic, and not without reason; and we seemed yearly to be on the eve of a cholera-epidemic; yet no one thought of attributing it to an Asiatic or Indian origin, and there was no proof that the disease was infectious."

I requested the staff of medical officers employed in Egypt to institute inquiries as to the existence of diarrhoea and cholera in the districts where they were stationed, antecedent to the officially declared outbreak on June 22nd at Damietta, and to report the results to me. Owing to the rapid decline of the epidemic, the Egyptian Government no longer found it necessary to retain the services of these gentlemen, and consequently but little time was given them to make the necessary inquiries.

I have, however, received from some of them valuable information, more especially from Surgeon-Major McNally, Madras Medical Service, in charge of Zagazig and district; and from Mr. Honman, in charge of Mahallet-el-Kebeer and district.

In a letter addressed to me, dated Cairo, September 1st, 1883, Surgeon-Major McNally shows that, in the villages in the neighbourhood of Zagazig, diarrhoea with vomiting had existed since the previous January, and had proved fatal to two hundred persons; that great mortality had taken place from cholera at Chibin-el-Kom prior to the report of its occurrence at Damietta; that, in certain villages in the neighbourhood of Benha, cholera had appeared before the reported outbreak at Damietta, and in one village the deaths were said to have numbered more than fifteen a day; and, finally, that M. Chevalier, an engineer, had informed him that he had known cholera to exist at Fayoum (Upper Egypt) six years ago, and also in other parts of Egypt during past years.

The existence of cholera was not officially recognised in Mahallet-el-Kebeer until July 16th, when three deaths were reported; and yet Mr. Honman, in his letter, dated Mahallet Kebera, August 30th, states that numerous cases of cholera had occurred in Mahallet before that date; that diarrhoea was a common complaint in the town, and that for a month before the outbreak the cases had been most severe and intractable; that at Miniatt-el-Samanoud and other villages there had been an epidemic in the month of May, as many as four a day dying out of a population of 4,000; that the deaths had been registered under the head of "Diarrhoea," and had been so numerous at Miniatt that the Cadi of the town had forbidden the use of the drum at funerals, in order not to draw attention to the number of deaths; and that, although on one day there were twenty-nine deaths, the fear of a *cordon* caused the fact to be suppressed.

It will be observed that all the facts above noted were communicated by medical men as a result of their personal experience and observation, and all being men of position and standing in their profession.

Mr. McCullough, an Inspector in the Department of the Minister of the Interior, while engaged at Menzaleh, near Damietta, in in-

investigating a judicial case, states that he was convinced by overwhelming evidence that cholera had been raging in the island of Matariah, on Lake Menzaleh, a month before it broke out at Damietta.

The next and last piece of evidence which I have to bring forward in support of the above is that obtained from an official enjoying a high position under the Egyptian Government, who told Sir Evelyn Baring, "We all know that cholera has been constant here, and generally follows the cattle-plague; but we are told to say nothing about it."

The documents from which the above abstracts are taken will be found in my second and third reports to Her Majesty's Government. A careful consideration of the facts satisfactorily proves that cholera has existed in Egypt in an endemic form since the epidemic of 1865, and probably anterior to that period, as shown by Dr. Patterson. The epidemic of 1883 was consequently the outcome of the disease which existed endemically in the country.

Dr. Dutrieux's conclusion that cholera-centres existed long before June 22nd (date of outbreak at Damietta), in several places in Lower Egypt, is confirmed by the data furnished by Surgeon-Major McNally and by Mr. Honman.

The evidence, considerable as it is, was collected in a few weeks. Had longer time been at my disposal, I believe it might have been materially added to. There is one significant feature as to the sources of my information. It was all, or rather nearly all, obtained from medical men not in the employ of the Egyptian Government. The inference consequently is, that either the Government medical officers had failed to recognise the disease, or else that they maintained a strict silence on the matter. This inference may be considered a harsh one. The time has arrived, however, when it is essential that all that bears on the origin of the late epidemic should be put plainly. It has been shrouded so long by collateral and incidental considerations, that I feel I should ill represent what I believe to be the facts by obscurity of language.

Cholera is recognised by a certain group of symptoms; and it is merely begging the question to say that a particular case coming under observation, though presenting all the phenomena of cholera, cannot be cholera, because there is no evidence of importation, and that it "does not propagate itself in the absence of all hygienic precautions." (See Dr. De Castro's letter.)

Dr. De Castro, the Delegate of the Italian Government, is an able and experienced officer, and is, moreover, a representative man. I have a great respect for his opinion, but I regret that I am unable to accept his conclusions. I presume Dr. De Castro would not refuse to accept the evidence afforded by certain symptoms, which indicated that he had before him a case of pneumonia, and no other disease, because he could not trace its cause, and then proceed to designate it by some other name; nor would he, after witnessing inoculation by small-pox virus, proceed to pronounce the resulting phenomena not those of small-pox, because the disease did not propagate itself.

Inoculation was formerly practised to a large extent in Lower Bengal and other parts of India, but is now happily being rapidly displaced by vaccination. Frequently years would elapse without the disease spreading among the community. Would it be fair to argue from this that the phenomena resulting from the inoculation-process were not those of small-pox, because they did not propagate themselves? A terrible awakening would probably await those who held such opinions, in the shape of an epidemic outbreak that would decimate the population. Here I am speaking of a disease the contagion of which is recognised as being perhaps the most virulent known; whereas cholera, in my opinion and in that of many others, is a non-contagious disease, and consequently not likely to spread from individual to individual, as Dr. De Castro evidently expects it to do.

The cause of the spread of cholera and diseases of the zymotic type depends on certain epidemiological laws not yet well understood, but which I shall have occasion to refer to further on.

In the nomenclature of disease in India, the term "cholera" is only permitted to be used when speaking of the existence of a certain group of symptoms; when these are recognised, the official return is "cholera." Choleraic diarrhoea has, for good and sufficient reasons, for some years past been struck out of the returns. Were the same rule applied to Egypt in the registration of disease, much confusion would be avoided, and such terms as "cholerine," "cholera nostras," "choleriform," etc., applied to modified forms of cholera, cease to exist.

If the cases communicated in many of the attached documents be not cases of true cholera, but rather of cholerine and cholera nos-

tras, then Bombay ought no longer to be regarded as the seat of endemic cholera, for the majority of the cases I have seen there, during intervals of epidemic activity, were cases of so-called "cholerine," "cholera nostras," etc., and they did not propagate themselves.

These several forms of the disease differ in no essential particular, either clinically or pathologically, from one another, and therefore ought to be registered as cholera.

Dr. De Castro also states, in his letter, that if the cases which had come under his observation were cases of cholera, then cholera existed in many of the large cities of Europe. Here I agree with him, for I feel little doubt that examples of cholera are of not unfrequent occurrence in many of the cities and towns of Europe, not excluding the British Isles. In certain parts of the Russian empire, cholera is affirmed to be endemic.

I shall next consider certain meteorological states which existed during the outbreak and preceded it. Before doing so, however, it will be interesting to refer to like phenomena which have been frequently observed, not in India only, but also in Europe, in connection with cholera.

Mr. Glaisher, in his Report on the Meteorology of London during the three cholera-epidemics of 1853-54, of 1832, and of 1848-49, says: "The three epidemics were attended with a particular state of atmosphere, characterised by a prevalent mist, thin in high places, dense in low. During the height of the epidemic, in all cases the reading of the barometer was remarkably high and the atmosphere thick. In 1849 and 1854 the temperature was above its average, and a stillness of air, amounting almost to calm, accompanied the progress on each occasion. In places near the river the night-temperatures were high, with small diurnal range, a dense torpid mist, and air charged with many impurities, a deficiency of electricity, and, as shown in 1854, a total absence of oxone, most probably destroyed by the decomposition of the organic matter with which the air, in these situations, is strongly charged."

Without entering into details, I may say that, in India, outbreaks of cholera are usually found associated with high temperature and a moist, stagnant atmosphere, inducing much languor and depression and a stifled feeling; and the Punjab, with its dry climate and sparse rainfall, affords no exception to this rule.

Dr. Roche, in writing of the outbreak of cholera at Kotree, Scinde, in September, 1862, which, as regards climate, is, perhaps, even drier than that of the Punjab, states the atmosphere to have been, during the month, unusually sultry, still, and moist, with a high temperature.

Mr. R. Borg, Her Majesty's Vice-Consul in Cairo, who has devoted much of his time to sanitary matters, informed me that "when cholera was at its height in 1865 in the capital, the sky was lead coloured, the atmosphere oppressive, so as to render breathing rather difficult at times; and the town of Cairo, as seen from the Mokattan Hills, seemed to be enveloped in a spherical cloud of thick mist during three consecutive days." He also observed that the sparrows deserted the town, and did not return until the epidemic was on the decline. These observations have been verified by others.

Brigade-Surgeon McDowell, A.M.D., Sanitary Officer of the Cairo district, reports that when the epidemic was at its height on July 23rd, a very peculiar condition of the atmosphere was observed; a yellowness of the air, somewhat of the nature of a fog, and it was quite calm. The sparrows, it was noticed, had deserted the place, and did not return till July 26th. On the night of July 23rd the cholera first attacked the British garrison at Kasr-en-Nil, Abassieh, and the Citadel.

It is curious to note that the Arabic phrase for cholera is "the yellow air" (el-hawa-el-asfar), and that the fact of birds deserting a place at such periods has also been remarked by the natives.

Surgeon Prendergast, A.M.D., informs me that on the day of the outbreak of cholera among the British troops at Ramleh (August 3rd), there was a high temperature, the air approached saturation-point, the wind, which, for many weeks before, had blown as usual from the north, slowly dropped, the heat became intense, attended with a feeling of oppression. The ripples died off the sea, leaving it as glassy as a quiet pool. The sky, usually studded with cirri, was cloudless. Now and then a faint breath of wind sprang up from the south-east, and as suddenly died away. Men who had served in India remarked that there was cholera in the air, and at 10.30 A.M. the first case was reported.

Another pertinent illustration is given by Dr. Kirker, R.N., of H.M.S. *Iris*, in his report of the recent cholera-outbreak at Chatby.

This village, of 2,000 inhabitants, though distant from Alex-

andria but a quarter of a mile, and in constant communication with it, had been free from the disease up to October 15th or 16th. Its sanitary condition was extremely bad. It is situated in a hollow, but is open to the north and the influx of the sea-breeze. "On September 19th, the prevalence of the north-westerly winds was broken. Then followed a period of variable winds, the easterly and southerly ones being the most frequent. The rain on October 9th and 10th may be taken as marking the termination of this period and the starting-point of another. In the second, from the night of the 10th to the night of the 15th October, the wind, which was always nearly light, varied from east to west only round by south." Frequently at night there was no wind at all, and the temperature rose from a maximum of 70° on the 10th to 84° on the 15th. "Now, I believe," continues Dr. Kirker, "that the stagnancy of the air over Chatby, owing much to its low and sheltered position, especially during the period from October 10th to 15th, forced the disease into existence, and that the influence of the motionless atmosphere was assisted by the rise in temperature and by the moisture of the ground following the rain on the 9th and 10th." "Again, the fact that the disease reappeared in Alexandria at or near the time it more violently struck Chatby, points to a common exciting condition, such as the weather, and discredits the theories of mere local causation."

Dr. Kirker has, at my request, been good enough to forward me some instructive meteorological data made by him during last June and July, at Port Saïd, Alexandria, and Damietta. The chart for the month of June is the more important, as it was at that time that the epidemic broke out. His views are more definitely expressed in a letter addressed to the editor of the *Egyptian Gazette*, dated Port Saïd, July 28th, 1883, and published in that journal on August 1st. He states that the meteorological phenomena antecedent to, and during, the outbreak at Damietta, may be divided into two periods; during the former period (May 28th to June 23rd), the winds were variable, many of the nights were almost or quite still and cloudless; the humidity of the air being excessive, at one time, on June 12th, 13th, 14th, and 17th, being at saturation-point (100), the average varying from 91 to 92; and there was no rain. In the latter period, from June 23rd to July 6th, the relative humidity was only 78 and 82, at 9.30 A.M. and 11 P.M. On June 24th, the sea-breeze was established, the wind blew during the day from the north-west, veering round towards the south-west during the night and early morning, and there were no calms.

I am further indebted to Dr. Kirker for some very valuable and highly interesting meteorological summaries for the month of June from 1870 to 1883 inclusive, which I have the pleasure to place before the members of the Society. As the letter which accompanied the summaries would only lose in force by anything I might have to say, I shall allow Dr. Kirker to speak for himself. His letter, dated *Iris*, at Malta, December 6th, 1883, is as follows.

"Sir,—I have the honour to inclose you a copy of the meteorological summaries for the month of June, from 1870 to 1883 inclusive, which, by the kind permission of M. A. Pirona, I have made from the meteorological register of the Observatoire et Station Météorologique de l'Impérial et Royal Institut Central de Vienne, at Alexandria.

"1. My object in sending the inclosure is to furnish you with the means of comparing, as regards weather, last June—the month when the cholera became epidemic in Egypt—with the Junes of the previous thirteen years.

"It is seen that in 1883 the mean barometric pressure (758.2 millimètres = 29.851 inches) was below the mean (758.7 millimètres = 29.871 inches) of the fourteen years; and that the extreme variation (5.1 millimètres = 0.200 inches) for the one year was less than the mean of the extremes (7.6 millimètres = 0.300 inches) for the period.

"The mean temperature (24.4° C. = 75.9° F.) in 1883 was only a little above the mean temperature (24.0° C. = 75.2° F.) of the fourteen years.

"The mean relative humidity (71) in 1883 was less than the mean (73) for the fourteen years. The maximum relative humidity for the month is not shown in the summaries, but the tables of daily registration, which will be more particularly referred to afterwards, show that in 1883 it reached 96—the highest recorded in any month whatsoever since January 1876.

"The mean relative amount of ozone (6.4) in 1883 is 13.5 per cent. less than the mean (7.4) for the fourteen years. On examination of the summaries of the ten months, January to October, it is seen that the mean relative amount of ozone for that period in 1883 is less by 17.0 per cent. than the mean for the same period in the

seven years 1875 to 1881. The ozone-observations do not extend further back than 1875, and the record for 1882 is incomplete.

"The mean wind-force for June 1883 is less than for any previous June for thirteen years. Again, the summaries of the ten months, January to October, show that the mean wind-force for that period, in 1883, is 36.8 per cent. less than the mean for the same period in the twelve years 1870 to 1881. Only in 1877 has this period as low a mean wind-force as in 1883.

"2. In one of my former communications, I pointed out that the nine days from the 12th to the 20th June last, was a period of excessive relative humidity, with occasional stagnancy of the air, especially at night. Now, M. Pirona has the monthly tables of daily registrations since 1876, and these show that the above period, as regards the combination of great moisture of the air and low wind-force, is unique in the meteorological history, not only of the month of June, but of the entire years since 1876. There are only about two periods of equal length in which the mean wind-force was so low—one in January 1877, and another in December 1878; but in these periods the mean relative humidity and temperature were also low. There are several periods of greater mean relative humidity, though one of the highest maximums recorded occurs in the June 1883 period; but all of these had a much higher mean wind-force.

"3. In a report which I wrote on the outbreak of cholera at Chatby, Alexandria, I said: 'Now, I believe that the stagnancy of the air over Chatby, owing much to its low and sheltered position, especially during the period from the 10th to the 15th October, forced the disease into existence; and that the influence of the motionless atmosphere was probably assisted by the rise of temperature and by the moisture of the ground following the rain on the 9th and 10th.'

"In connection with the time here referred to, M. Pirona's summaries show nothing particular for October 1883. The daily registrations, however, show that then (10th to 15th October) a fall in the force of the wind, and a change in direction from northerly to southerly took place. The only other October since 1876 in which a similar period occurred was that of 1877.

"In conclusion, I think it may be safely said, that M. Pirona's observations give weight to the opinion that this year meteorological conditions had a strong influence in the generation of the cholera-epidemic; for they show that the year 1883, particularly in the month of June, has differed even from its comparatively remote predecessors in the directions most favourable to disease."

The frequency with which atmospheric phenomena have been observed in connection with outbreaks of cholera leads to the conclusion that they stand in close relation one to the other. Whether that be as cause and effect, is perhaps hard to say. It is probable that it is to a combination of certain conditions of a cosmo-telluric character, of air, soil, and water (filth, as in Egypt, being a powerful factor), that the development of an epidemic is due. Given, as in Egypt, endemic centres, the peculiar atmospheric state noticed would probably act as an exciting cause in the immediate production of the epidemic outbreak.

THE BRAIN AND ITS INFLUENCE ON THE MENTAL FACULTIES.—A recent discussion on the weight of Turgenieff's brain has called attention to the subject of human brains, and a scientist, M. Nikiforoff has published in the *Novosti* an article, in which he states that the weight of the brain has no influence whatever on the mental faculties. The average weight of a man's brain is, according to Luschka, 1,424 grammes, of a woman's 1,272 grammes; Krause gives the averages as 1,570 and 1,350 respectively. The maximum weight is said to be 1,600 grammes, and the minimum 800 grammes. The brain of the celebrated mineralogist Hausmann weighed 1,206 grammes. It ought to be remembered that the significance of the weight of the brain should depend upon the proportion it bears to the dimensions of the whole body, and to the age of the individual. Byron died at the age of thirty-six, the great geometrician Gauss at seventy-eight years of age; the brains of the two should, therefore, not be compared. It is equally important to know what was the cause of death, for long disease, or old age exhaust the brain. To define the real degree of development of the brain, it is, therefore, necessary to have a knowledge of the condition of the whole body, and as this is usually lacking, the mere record of weight possesses little significance.

MEDICAL MAGISTRATE.—Dr. J. Holmes Joy, of Tamworth, has been placed on the commission of the peace for Staffordshire. In June of last year, Dr. Joy was made a magistrate for the county of Warwick.