Plague : papers relating to the modern history and recent progress of Levantine plague / prepared from the time to time by direction of the president of the Local Government Board, with other papers ; sented to both House of Parliament by Command of Her Majesty.

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Great Britain. Local Government Board.
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Publication/Creation

London : Eyre & Spottiswoode for H.M.S.O, 1879.

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PLAGUE.

PAPERS

RELATING TO THE

MODERN HISTORY AND RECENT PROGRESS OF LEVANTINE PLAGUE;

PREPARED FROM TIME TO TIME BY DIRECTION OF THE PRESIDENT OF THE LOCAL GOVERNMENT BOARD,

WITH OTHER PAPERS.

I.—Extracts from Reports of the Medical Officers of the Board.
II.—Memoranda by Mr. Netten Radcliffe, with Appendices.
III.—Papers relating to the Medical Aspects of Quarantine.

Presented to both Houses of Parliament by Command of Her Majesty.
1879.

LONDON:
PRINTED BY GEORGE EDWARD EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1879.

[C.-2262.] *Price* 1*s.* 6*d.*

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PAPERS

RELATING TO

THE MODERN HISTORY AND RECENT PROGRESS OF LEVANTINE PLAGUE.

PREFATORY NOTE BY THE ASSISTANT MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD.

In the following papers, extracted for the most part from recent Reports of the Medical Officers of the Local Government Board, will be found the records of the information that the Board have now for some years been engaged in collecting respecting the progress of Plague.

The observation of foreign epidemic disease that is undertaken by the Board is made primarily in the interests of the public health of the kingdom, as it may possibly come to be influenced by such disease; but such disease is also studied with the object of enabling the Board to perform the function which now attaches to them of advising other Departments of Government on medical questions arising in the communications of Great Britain with the colonies and with foreign states.

Some five years ago, in the course of this systematic observation of foreign epidemics, account had to be taken of an apparently renewed activity of Plague in Eastern countries where it had formerly prevailed, but in which it had recently been unheard of; and since that period there has been occasion for particular and continuous study of the increasingly significant facts respecting the movements and phenomena of this disease. From material contributed from many sources, but mainly from papers communicated by the Foreign Office, digests have from time to time been made; and these, as now collected, afford an account, as complete as the materials permit, of the history of Plague from the time of its re-appearance in the East and of the commencement of its exceptional diffusion in Mesopotamia, Western Arabia, and Northern Africa in 1873–74, up to the latest time for which data have been procurable, viz., 1877, when the disease had seemed to be at an end in these countries, but when fears had come to be entertained of its extension across the frontiers of Russia.

In the examination of this material, which has been of great bulk and intricacy, and in interpreting the medical significance of the varying manifestations of the disease, the Board have availed themselves of the exceptional abilities of their Inspector, Mr. J. Netten Radcliffe, who has brought a critical medical knowledge to bear upon each step of this laborious investigation. In a postscript to his third memorandum Mr. Radcliffe has

brought down the facts concerning the presence of Plague in Russia to a later date than that of the memorandum itself.

The Board are indebted to the Epidemiological Society for a valuable paper on the Characters of Plague recently contributed to that society by Dr. Dickson, of Her Majesty's Embassy, Constantinople, and giving the experiences of Dr. Cabiadis of the outbreaks of 1876–77 in Mesopotamia.

To these papers, more particularly relating to recent movements of Plague, are appended certain other papers having reference to Quarantine regarded as a means of protecting this country against foreign epidemics. In the first of these papers, dated 1865, the late Medical Officer of the Board, Mr. Simon, considers at some length the medical postulates of the system which professes to exclude from a country all individuals coming from infected places until they have ceased to be able to communicate the disease to other persons with whom they may come into relation, and he examines the conditions that are required for effect to be given to such a system. In paper No. 3 of the series, the Board's present Medical Officer, Dr. Seaton, has considered the systematic action in use in England to prevent the importation of infectious diseases, a system that differs in certain material respects from what is known as quarantine.

The present papers do not indicate that the future of Plague in Europe can yet be predicted; it cannot be said whether or not the epidemic will extend, beyond its recent area of prevalence, in the direction of Western Europe. If it should do so, it is hardly to be expected that some cases of the disease will not find their way into the United Kingdom; and, in the event of such importation, it is in general sanitary measures of the sort that are, happily, coming into increasing and more general use against current infectious diseases, that safety will be found against the extension of Plague in the country.

GEORGE BUCHANAN.

10th March 1879.

I.

EXTRACTS RELATING TO PLAGUE

FROM

REPORTS OF MEDICAL OFFICERS OF THE LOCAL GOVERNMENT BOARD.

1.—*Extract from the Annual Report of the Medical Officer to the Privy Council and Local Government Board for the year* 1874 (*Mr. Simon*).

Foreign Epidemics.

As another non-administrative work of the Board in the Medical Department, I have to refer to the cognizance which is kept up of the progress of foreign epidemics; partly with regard to any existing possibilities of their extending to this country or its dependencies, and partly with reference to the quarantine-conduct of other countries. In this branch I have of late years had constant assistance from Mr. Netten Radcliffe, who notes for the office all information received from Her Majesty's Indian, Colonial, and Foreign Secretariats, with regard to the epidemics and quarantines of other countries. In 1866, when submitting my eighth annual report to the Privy Council, I presented a report by Mr. Radcliffe, bringing down to that date an account of such foreign movements of cholera as were of interest to this country; and Mr. Radcliffe is now compiling a continuation of that account in a paper which I hope shortly to lay before you in a supplement to the present report.

As regards the foreign epidemics of 1874, I am glad to be able to report further subsidence of the continental cholera-wave which was seriously threatening us in 1871 and 1872, but has since that time been retreating, and appears now to be at its lowest ebb. On the other hand, I have to state that during 1874 Levantine Plague came into unusual mention in some of the foreign correspondence; that in one of the Yemen provinces of Arabia, among the high-lying villages of the Assur country, which had been visited by the disease in 1816 and 1853, there were considerable outbreaks of plague in 1874; that in Tripoli, too, a small outbreak of plague again affected the encampments of Benghazi, where already there had been an outbreak in 1858; that in the Lower Euphrates Valley, where the Hindieh marsh-country had had an outbreak in 1867, the Afij marsh-country (on the opposite side of the river) suffered in 1874 a severe outbreak; and that, at least of the last, the consequences are not yet ended: for the disease spread in both directions, from Kerbela to Samawa, producing very large mortality, and at the date of my present report is still continuing.* Plague has now for so long been comparatively unknown in the countries where it used to be most fatally endemic, and European interest in it has in consequence become so nearly obsolete, that, in hearing of outbreaks such as the above, we are without sufficient standards for prognosticating as to their relative importance. Undoubtedly, however, the above-mentioned concurrence of outbreaks is exceptional; and if it expresses that Plague is really for the time tending to re-development in the countries which formerly bred it, the facts may be of general interest, if only with reference to the derangements of traffic which could hardly fail to arise, were Plague again to show itself in any considerable port of the Red Sea or the Mediterranean.

March 31, 1875. JOHN SIMON.

2.—*Extract from the Annual Report of the Medical Officer to the Privy Council and Local Government Board for the year* 1875 (*Mr. Simon*).

In respect of the cognizance which the Medical Department has to take of the progress of foreign epidemics, I subjoin [*see* p. 5 of these papers] a memorandum by Mr. Netten Radcliffe on the modern history and more recent movements of Levantine Plague. I regret to observe that at the present time the infection of the

* In the winter 1870–1, there had been an outbreak of plague in Persian Kurdistan, where previously none had been observed since 1835; and when the Hindieh outbreak of 1867 occurred, plague had not been observed in Mesopotamia since 1834.

disease is in Baghdad; for, being there, it may find considerable facilities for diffusing itself to other places; and though, in view of the experience of the last two centuries, we need not, I think, anticipate as probable that, if Plague should extend considerably in the Levant, it must therefore necessarily extend to any part of Western Europe, still, any wide Eastern diffusion of the disease, especially if to the seaports of Turkey or Egypt, could hardly fail to excite alarm in Western Europe, and at least to cause much derangement of traffic.

March 31, 1876. JOHN SIMON.

3.—*Extract from the Annual Report of the Medical Officer to the Local Government Board for the year* 1876 (*Dr. Seaton*).

Of foreign epidemics concerning which the Local Government Board were called on in 1876 to give advice through their Medical Department, the only one requiring special mention is the Plague, which disease prevailed in Mesopotamia and extended to some places in Persia in the first half of the year. It subsided as usual in July, but has again, I regret to say, re-appeared during the present year. Mr. Simon's report for 1875 contains a most interesting memorandum by Mr. Netten Radcliffe on the modern history of that disease and its recent progess up to the then time of writing; and Mr. Radcliffe now contributes to my present report a further memorandum [*see* p. 23 of these papers], in which he continues his narration to the middle of the present year (1877), and adds, at my request, a synopsis, from official despatches, of the so-called preventive measures adopted by the Ottoman and other Governments. In its bearings on questions of quarantine this account is full of interest.

June 30, 1877. EDWARD C. SEATON.

4.—*Extract from the Annual Report of the Medical Officer to the Local Government Board for the year* 1877 (*Dr. Seaton*).

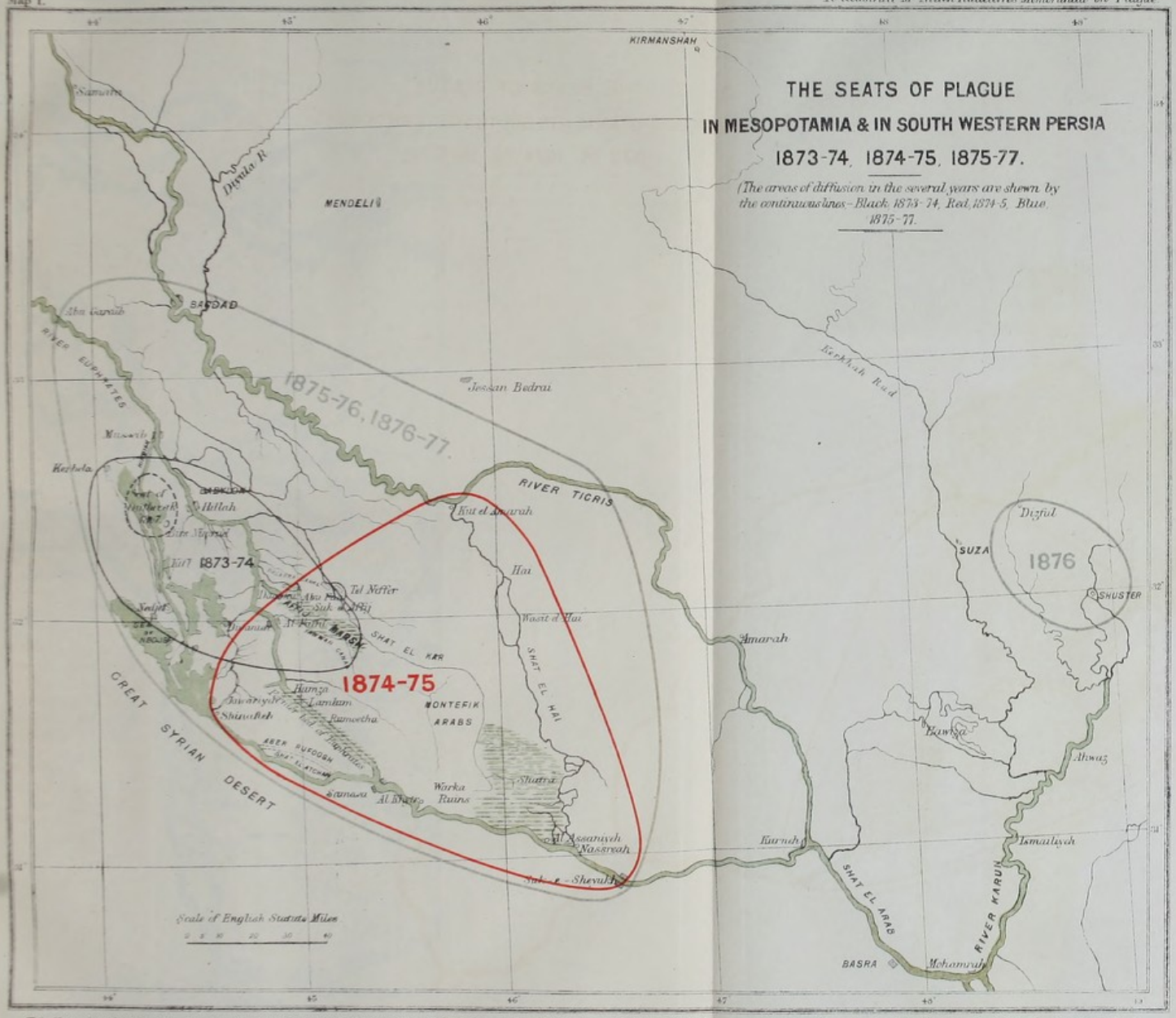
Adverting now to foreign epidemics, the progress of which it is the business of my office to watch, I may state, in continuation of what was said in my last annual report, that since the middle of 1877, up to which date I then carried the history of the late epidemic of Plague, there has been apparently a complete cessation of that disease in Mesopotamia.

But during 1877 there were outbreaks of Plague of great severity, though confined to comparatively limited areas, in Northern Persia, including an outbreak at Resht and the district adjacent to that city, which for a time assumed such proportions as to cause alarm to the Russian Government for the safety of Trans-Caucasia. The disease, however, completely subsided, and we have now no certain knowledge of its existence, whether in Persia, Mesopotamia, or the Levant. Particulars of these special outbreaks in 1877, by Mr. Netten Radcliffe, will be found [page 37 of these papers], together with an account of an outbreak of bubonic Plague in North-Western India in 1876–7, the existence of which was unknown to him at the time my last report was issued.

July 31, 1878. EDWARD C. SEATON.

Map I.

To illustrate Mr Netten Raddiffe's Memoranda on Plague

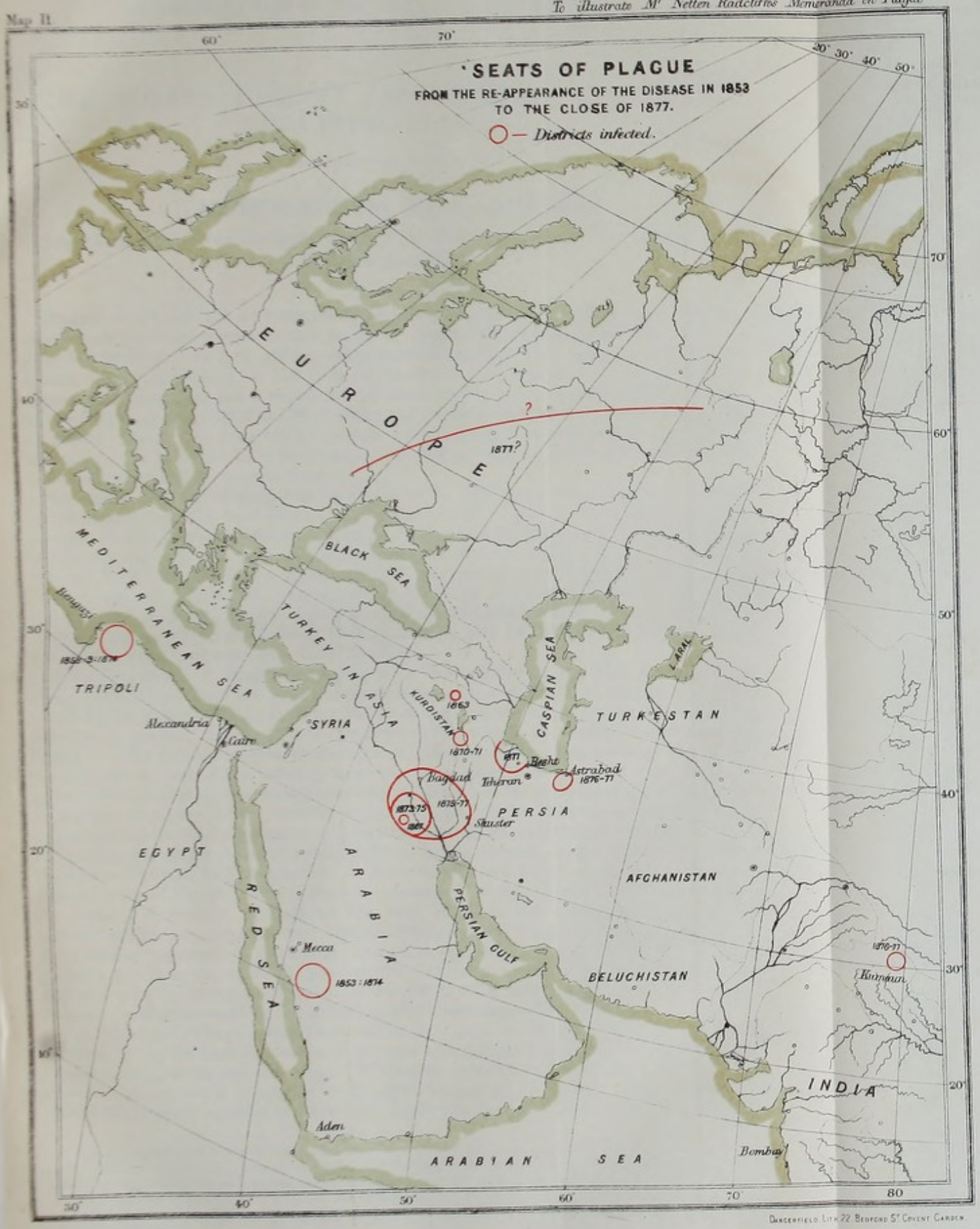


This Map is based upon a late Survey in the possession of the India Office. The position as decribed by Surgeon-Major Colvill. Report on Plague in Mesopotamia, 1874-75, of the Abu Rutbosh, of certain places and of the Rice Fields below the site of Lamlum, where the stream running along the proper channel of the Euphrates is lost, are indicated conjecturally.

Day & Son Lith 22 Bedford St Covent Garden

Map II.

To illustrate Mr Netten Radcliffe's Memoranda on Plague



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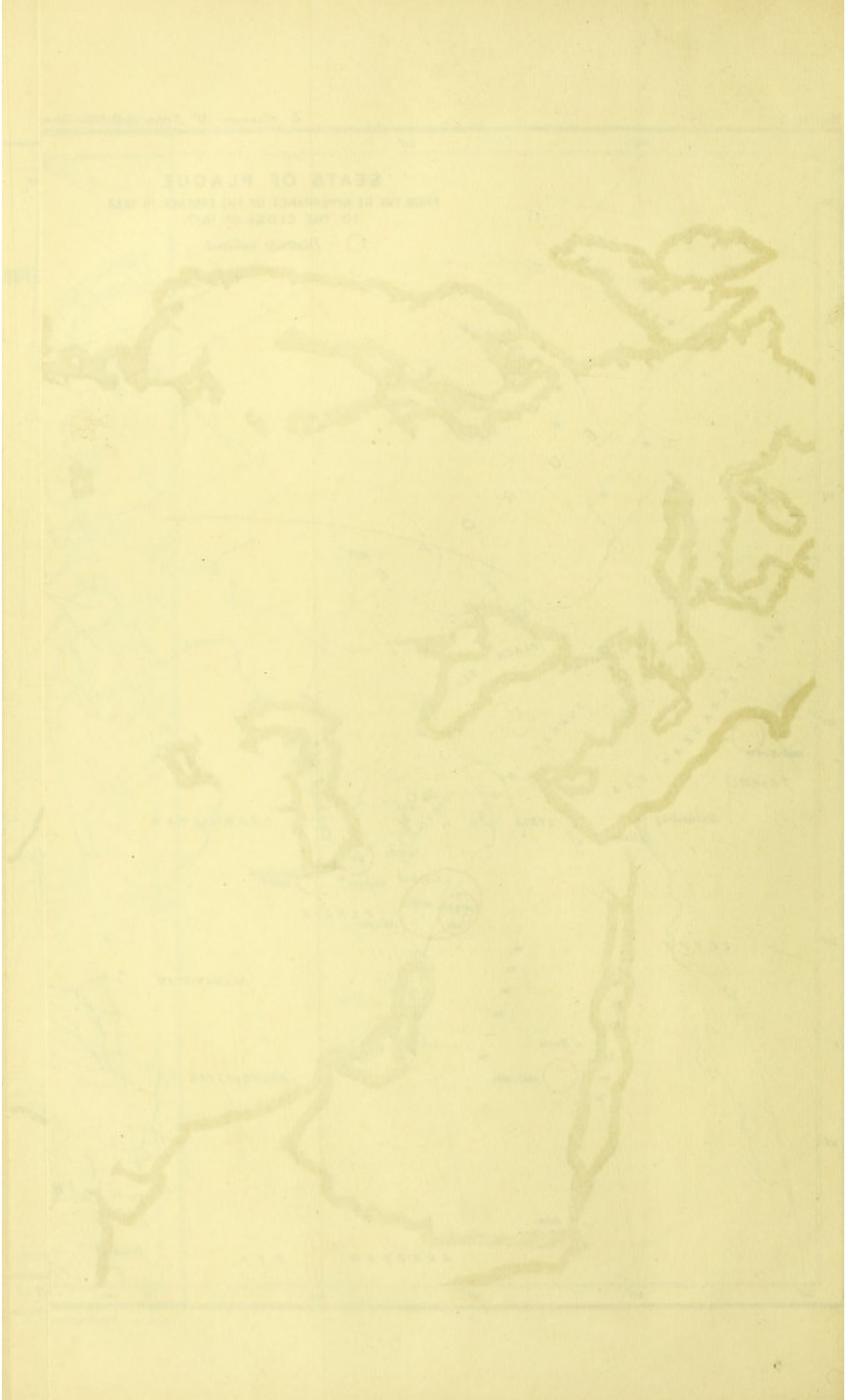

II.

MEMORANDA BY MR. NETTEN RADCLIFFE

ON

THE MODERN HISTORY AND RECENT PROGRESS OF LEVANTINE PLAGUE.*

MEMORANDUM No. I.—1853-1875.

(*From the Report of the Medical Officer of the Privy Council and Local Government Board for* 1875.)

England and Europe, the latter half of the 17th century. 1665–1679.

Plague, which for an undetermined period had prevailed in England, either as a continuously present disease or as a series of frequently recurring epidemic invasions, after the great outbreak of 1665 quickly subsided and became extinct. In the year named (1665), according to the Bills of Mortality, it caused in London, which is supposed to have then had a population of about half a million persons, 68,596 deaths; in the following year (1666) 1,998 deaths; and in the subsequent 13 years (1666-1679) 81 deaths. After the year 1679 no death from plague was recorded in the Bills of Mortality. In the year 1704 the name of the disease was omitted from the Bills, and it has not since had a place in them.

The great outbreak of plague in this country in 1665 was part of a general diffusion of the disease, common probably to the countries lying east of the Mediterranean, to Europe, and to Nothern Africa. In parts of Central, Southern, and Eastern Europe the disease was still prevalent as the century drew to a close, and early in the following century (the 18th) it again became active and spread very widely in Continental Europe, the countries of the Levant, and in Northern and North-Western Africa. As the century advanced plague died out in Western and Northern Europe and in the greater number of the countries of Central Europe, but in Eastern Europe the disease continued into the present (the 19th) century.

The 18th century.

From the period of cessation of plague in this country in the 17th century to the termination of the 18th century, the phenomena of the diffusion of plague in Europe, as far as the imperfect data existing on the subject permit a judgment to be formed, indicate a gradual diminution of the area within which the malady could retain its activity. The better recorded phenomena of diffusion of the disease within the present century show such diminution proceeding at a greatly augmented rate until the apparent extinction of the malady over the whole area of its previous range of prevalence in Europe, Northern Africa, and the countries east of the Mediterranean, the disease apparently at no time presenting any amelioration of its accustomed virulence.

The 19th century. 1800–1824.

In 1812–14, plague became widely diffused in the Levant, in the districts bordering the Lower Danube, in Transylvania, in Asia Minor, and in Armenia, also in Northern Africa, west of Egypt. This diffusion continued in one district or another within the area of dispersion throughout the next 20 years, but during the whole of that period there was no extension into Central, Northern, and Western Europe. Hardly had the diffusion beginning in 1812 come to an end (if, indeed, it had wholly ceased) when plague again became active in the Levant. Greatly as the area of prevalence had diminished in the previous diffusion, as compared with still earlier diffusions, the area was still further lessened in the diffusion which commenced in 1834–35.

1834–1841.

This latter diffusion, the last from which any part of Europe suffered, was chiefly confined to the Turkish dominions in Europe and Asia, and to Egypt. The malady extended to the towns and districts of Wallachia bordering the Danube, and also into Greece, but no other countries in Europe contiguous to Turkey were affected. In Africa, the malady appears to have been limited to Egypt. Five years after the com-

* The orthography of Keith Johnston's *Index Geographicus* has been, as a rule, followed in the spelling of proper names in the text of these memoranda. In dealing with numerous reports of many writers, each of whom uses apparently his own system of orthography, I may not always have secured uniformity, and where I have had occasion to quote I have retained the orthography of the writer; but, little difficulty will be experienced, I believe, in recognising places and communities referred to, although they may appear in various orthographical guises.

Cessation of Plague in Europe, 1841.

mencement of this diffusion, namely in 1839, plague disappeared from Constantinople, and two years after its cessation on the Bosphorus it died out in the European provinces of the Porte.

1841–1844.

While plague was thus becoming extinct in Europe, it again became actively diffusive in Egypt, Syria, and Palestine (1840–41.) The disease was apparently not less virulent in this diffusion than in previous diffusions, but except, probably, some dispersion into parts of Asia Minor, it did not spread beyond the countries named. With the termination of this diffusion plague vanished from the East. No case of the disease is known to have occurred in Syria, Palestine, and Asia Minor since 1843, nor in Egypt since 1844.

Cessation in Syria, Palestine, and Asia Minor, 1843.

Cessation in Egypt, 1844.

For centuries Egypt and the countries lying to the east of the Mediterranean had been regarded as the birth-place of the several diffusions of plague which had spread over Europe. In these countries the disease lingered longest and was latest to disappear during that gradual decrease of the area of prevalence, which observed in this country after the great outbreak of 1665, came to an end in Egypt with the apparent extinction of the disease, in 1844.*

The Reappearance of Plague. Western Arabia 1853.

Fourteen years after the cessation of plague in the countries where it is believed to have previously prevailed from time immemorial, the disease again appeared in the basin of the Mediterranean, within the province of Tripoli, the easternmost state of Barbary. During the interval no previous prevalence of plague had come to knowledge, but it is now known (the fact having been ascertained in 1874) that plague had been present in the highlands of Western Arabia in 1853. In that year an outbreak took place in the mountainous region of the Assyr district, North Yemen, part it would seem of a wider diffusion of the disease in Arabia. The mere fact appears to have been alone ascertained during an inquiry made under the direction of the Ottoman Government relating to the appearance of plague in the same district in 1874.†

Bengazi, Tripoli, 1858–59.

In 1858, about the middle of April, plague broke out in the province of Bengazi, Regency of Tripoli, North Africa. This province (the ancient maritime region of Barca, including the Cyrenaica or Pentapolis), celebrated of old for the fertility of its highlands and of its littoral, affords pasturage for many flocks and herds and yields rich crops of grain, notwithstanding an imperfect and partial cultivation of the soil. The population is chiefly nomadic, frequenting the higher grounds and the table-land of Merdj during the hot season, when the pasturage in the plains has been parched up and withered, and returning to the low-lying tracts after the autumnal rains, when they have become covered by luxuriant vegetation. The fixed population is principally accumulated in the only two towns of the province, namely, Bengazi (built on the site of the former Berenice and more remote Hesperides), and Derna (built on the site of the former Darnis), each of which towns contains about 12,000 inhabitants. Villages formed by small groups of miserable huts exist on the littoral and in the the interior, and several Arab monasteries; and certain Arab tribes occupy cave dwellings.

Plague, in 1858, first appeared in the province of Bengazi, in an Arab encampment consisting of 30 huts, pitched at the time eight hours distant from the town of Bengazi, in the plain of Amalisgalen Fiddaar. The disease was next observed in the town of Bengazi at the beginning of May, and afterwards it spread throughout four of the five districts into which the province is divided, namely, Bengazi, Derna, Gharb, and Chark, affecting both the nomadic and the fixed populations. Derna was attacked at the close of May or beginning of June, the development of the malady there following upon an importation of a case from Bengazi; and Merdj, the chief place of the district of Gharb, a village situated on the Cyrenaic plateau, and having a fixed population of 100, together with a garrison of 100 soldiers, was attacked about the 15th June. The district of Auldja, which has a very scanty fixed population living in the midst of sandy desert, escaped the outbreak.

The disease was most prevalent and the loss of life from it was greatest during the year 1858, but it continued into the following year, disappearing from the towns of Bengazi and Derna in June 1859. The number of attacks which occurred is not

* See as to prevalence of plague during the early part of the 19th century, Dr. Gavin Milroy's "Sketch of the Geography, &c. of the Plague during the Present Century" (the British and Foreign Medico-Chirurgical Review, Vol. XXXIII. (Vol. I. 1864), p. 463; also Hirsch's *Handbuch des historisch-geographischen Pathologie*, Vol. I., p. 197.

† See on this subject a letter of [the physician to the British Embassy, Constantinople, and British delegate to the Ottoman General Board of Health,] Dr. E. D. Dickson, p. 16.

known, but the mortality among the sick who came under observation was about 40 per cent., and the total deaths were estimated approximately to have been 4,000.

This appearance of plague in the province of Bengazi had been preceded by four years of drought and consequent failure of crops. Each successive year the miseries arising from dearth had increased. The greater part of the flocks and herds were destroyed from want of food, and the mortality among horned cattle was augmented by a fatal epizootic which attacked them. Plague appeared when the sufferings of the population from famine were greatest.*

Persian Kurdistan, 1863.

In November 1863, the Ottoman quarantine physican at Bayazid, on the Turco-Persian frontier, reported the occurrence of a fatal bubonic disease, resembling plague, in the district of Maku,† Persian Kurdistan. The nature of this disease and the conditions under which it was developed were investigated by Dr. Rossi, the inspector of quarantine at Erzerum, under instructions from the Ottoman General Board of Health. Dr. Rossi was accompanied during his investigation by Dr. Auriema, Dr. Pandeli, Aali Effendi, director of quarantine at Bayazid, and Mirza Aga, a member of the Municipal Court at Bayazid. The result of his inquiry is thus described in a report by Dr. E. D. Dickson to Her Majesty's Representative at Constantinople, dated 29th December 1863:—

"Dr. Rossi examined eight cases affected with this malady and the symptoms presented by them were as follows:—The invasion of the complaint was marked by fever of a burning nature; lassitude and great debility; dejected aspect; vertigo; headache; intellect more or less disturbed; tongue dry or covered with white fur; constipation; and darting pain with swelling either in the axilla or in the groin. These were followed, from the second up to the fifth day, by the appearance of one or more sloughing boils or carbuncles on that side of the person which had been affected with the glandular pain and swelling. In two instances the sides of the neck were painful, followed on the third day by a sloughing boil on the cervical vertebræ. On the appearance of the boils, the axillary and inguinal swellings subsided. In one case the manifestation of a carbuncle was followed by diarrhœa. When the boils suppurated, the patients generally felt relieved.

"The population of Maku is estimated by Dr. Rossi at 1,500 inhabitants: of these above 50 were said to be actually laid up with the distemper. A month before, double this number were ill; but the epidemic had considerably diminished after the fall of snow and lowered temperature.

"The epidemic originally declared itself in the month of September among the tribe of Jellali who reside at 'Ak-Ghiol,' 11 hours distant from the frontier, opposite to Erwan, and subsequently appeared in the town of Maku. It was asserted that no deaths ensued from it, but Dr. Rossi was impressed with the idea that the Persians were endeavouring to conceal the truth from him. In the villages of 'Akdahan' and 'Danali,' several deaths had occurred and come to his knowledge. The distemper still prevailed at 'Ak-Ghiol,' and Aali Khan, the ruler of Maku, has prohibited the admittance into his territory of those Koordish tribes who are affected with the disease.

"Dr. Rossi considers the epidemic to be one of *true plague*, and he attributes its manifestation to the severe murrain existing at Maku, which infects the whole district with putrid emanations arising from the unburied bodies of dead cattle, the use of diseased meat as food by the inhabitants, and poverty, owing to the failure of the crops. . . . .

"The Board of Health, neither satisfied with the inspection made by Dr. Rossi, nor convinced that the distemper reigning at Maku is really the plague, have ordered Dr. Bimsenstein, their Sanitary Agent at Teheran, to proceed without delay and take up his residence at Maku, and report from time to time on the nature and progress of this malady."

Dr. Bimsenstein visited the district of Maku in January 1864. His inquiry included the town of Maku and 25 villages, but not the nomadic tribe among whom the disease first appeared. He discovered one case only of bubonic disease, which he believed to be plague, the patient, a young man, being convalescent at the time. As the general result of this investigation, Dr. Bimsenstein, in a report dated the 15th February 1864, writes:—"Pour moi il n'y a pas de doute que la peste y avait existé "parmi les nomades et que le bruit qui courait alors de l'existence de cette maladie "était bien fondé."‡

The Lower Euphrates, 1867.

Eight years after the outbreak of plague in the province of Bengazi, and four years after the reported occurrence of the disease in north-western Persia, the malady

* See on this outbreak a report by Dr. Bartoletti, who was commissioned, in conjunction with Dr. Amadeo, to investigate it; and various reports regarding the outbreak made by Dr. Fauvel, who was the sanitary representative of France in Constantinople at the time (and which include summaries of Dr. Barozzi's reports, who was sent to Bengazi by the Ottoman Government early in 1859), published in the *Recueil des Travaux Comité Consultatif d'Hygiène publique de France*, tome 4e, pp. 151–212.

† The town of Maku (province of Azerbijan) lies in the extreme north-west of Persia.

‡ Sir Samuel Baker, in his account of the discovery of the Albert N'Yanza, describes a pestilential outbreak of disease, observed on his return journey, at Khartoum, late in 1864 and at the beginning of 1865. He writes of it as "plague" or "malignant typhus." None of the symptoms most characteristic of the former disease are mentioned, and the latter designation, so far as the description admits of a judgment being formed, would seem the more accurate one. (*The Albert N'Yanza Great Basin of the Nile*, chaps. 18 and 19.)

appeared among the Arabs inhabiting the Hindieh marshes on the Lower Euphrates. These marshes lie on the west bank of the river in close proximity to the ruins of ancient Babylon, and they cover a district measuring about 60 miles in length from north to south, and 20 miles in breadth from east to west. Into the northern extremity of these marshes opens the Hindieh canal; and their southern extremity communicates with the great inland lake known as the Sea of Nedjef (the Bahr-i-Nedjef). The Hindieh canal is a navigable channel which begins, according to Mr. Kennett Loftus, about two miles below the Khan at Musseib, and about 16 miles above the existing ruins of Babylon. It follows the course of an ancient canal constructed for the relief of the low-lying grounds east of the stream during its periodical floods, and for purposes of irrigation, and derives its present designation from an Indian prince who, a century and a quarter ago, opened out the channel which had then become blocked. The mouth of the Hindieh is dammed so as to regulate the amount of water passing into it, but at times, in exceptional floods, the dam is carried away. The vast body of water which then passes through the canal, converts the whole district lying between its outlet and the Sea of Nedjef into an inundation, as also the district lying between the outlet of that sheet of water and Samava. When the river has fallen to its usual level, the mouth of the Hindieh remaining open, a deep stream 180 feet wide passes along the canal into and through the marshes to the Sea of Nedjef, and by this route and the streams flowing from the Sea of Nedjef into the Euphrates, merchandise is conveyed from Hillah to Basra. Indeed, along this route, through the Hindieh marshes and the Sea of Nedjef and its outflow, it would appear that at the present time navigation can alone be maintained between the Upper and Lower Euphrates. For the volume of the river is so greatly diminished, by the amount of water passing through the Hindieh canal and certain other canals, that below Lamlum the stream in the proper channel is entirely absorbed in the extensive rice-fields which exist there.*

West of the Hindieh marshes is the Syrian desert, and to the north-west, on the skirt of the desert, within eye-shot, Kerbela (Meshed Hussein), and to the south, overlooking the Sea of Nedjef, Nedjef (Meshed Ali). Nedjef, the burial place of Ali, the fourth caliph, and Kerbela, the burial place of his two sons, Hussein, "the Martyr," and Abbas, are sacred to the Shiah Mahommedans. They form a centre of pilgrimage, second only in importance, among the Mahommedans, to that of Mecca. To both cities annually resort many thousands of pilgrims from Persia, the Mahommedan districts of Caucasia, and from Hindostan, carrying with them great numbers of corpses, in all stages of decomposition, for burial in the sacred soil. Pilgrims from Caucasia, northern, central, and eastern Persia, travel to their destination by way of Bagdad and thence to Musseib (crossing the river at that place) and Kerbela, or to Hillah (traversing the stream there), and through the Hindieh marshes by boat to Nedjef. Pilgrims from southern Persia and Hindostan ascend the Euphrates to Samava, and then pass along the principal outlet of the Sea of Nedjef, the Shat-el-Atchan (the western branch of the Euphrates, as it has been termed), and cross the Sea of Nedjef to Nedjef. Many pilgrims after performing their devotions at Nedjef and Kerbela, travel onwards to Mecca, by way of central or northern Arabia or Syria. Others first perform the pilgrimage to Mecca, visiting Nedjef and Kerbela on their return homewards. In 1871 a caravan of pilgrims bound for Mecca, which had left Nedjef at a time when cholera was prevalent there, and travelled by the northern route through Arabia, introduced cholera into Haïl, the chief town of the Jebel Shomer district. Thence the disease was propagated to Medina, Mecca, and the east coast of the Red Sea; and in the following year (1872) it spread into Nubia.

The Hindieh marshes are inhabited by many communities of Arabs of the Beni-Taraf tribe. These live in villages erected upon the islets within the marshes or upon the outskirts. The villages for the most part are formed of huts, or rather "dug-outs," hollowed in the wet soil, and roofed with reeds covered with matting or thickly plastered with mud. The wretchedness of these dwellings is augmented by the indescribably filthy habits of the occupiers in persons and surroundings. Rice is largely cultivated by the different communities, but not to the exclusion of other grain, and they possess large flocks of sheep and herds of cattle. The men of the Beni-Taraf tribe are described as remarkably well-limbed, active, and athletic. They and their families live chiefly upon rice (eaten, it is to be presumed, although this is not stated, with sheep's-tail fat, as pillaff), bread, and dates, little flesh meat being consumed. Recent medical visitors to the marshes have stated that the communities

* See Surgeon-Major Colvill's Report on Plague in Mesopotamia, 1874–5, Appendix, p. 22. See also Map I.

are singularly free from signs of marsh poisoning. On the other hand, malarial fevers (occasionally pernicious) are spoken of as occurring in the district. Very probably the state of health of the communities varies greatly with the state of the marshes. When the mouth of the Hindieh canal is freely open, the marshes are in fact an inundation with a current moving steadily towards the Sea of Nedjef; when it is partially or wholly closed they may become stagnant swamps, the water of the canal being retained within the various irrigation channels.

The Hindieh marshes, as observed from the summit of Birs Nimrúd, are thus described by Mr. Kennett Loftus (*Travels and Researches in Chaldæa and Susiana*), who visited the locality in 1854:—

"The view from the summit of the Birs Nimrúd is very extensive, and its utter desolation has been the theme of frequent observation. No one can stand there and survey the scene around without being struck with the literal fulfilment of Isaiah's prophecy:—'I will make it a possession for the 'bittern, and pools of water; and I will sweep it with the besom of destruction, saith the Lord of 'Hosts.' Spreading out like a vast sea upon the north and west is a marsh, which all the labours of the ancient and modern rulers of the country have never been able to subdue. In certain seasons the waters of the Euphrates rise above their ordinary level and flood the whole surface of the low lands of Chaldæa, confirming every word of the prophet.

"Bordering upon this marsh a few spots attract the eye and relieve the long level of the horizon. Due south stands the little tomb of the prophet Ezekiel, and at the distance of 50 miles, in the mirage of early morning, may be discerned the mosque of the sainted Ali, glistening like a speck of gold as the beams of the rising sun play upon its surface. Nearer at hand, on the north-west, are the twin domes of Kerbela, the burial place of Ali's slaughtered sons. The edge and islands of the marsh are at times dotted with encampments of Khuzeyl Arabs, and with the telescope may be distinguished their numerous flocks of sheep and camels, while the hum of busy voices can be distinctly heard a distance of full six miles across the waters.

"From the Birs Nimrúd southwards a road runs along the raised bank, which here in a measure restrains the marsh within bounds. A succession of large canal courses, now dry, are crossed during a ride of 12 miles to the little town of Keffil, which, from its want of luxuriant trees and vegetation, looks dull and sombre in the extreme, a fitting place for the sepulchre of a captive prophet in a strange land. There have been trees at some time or other, as a few stunted palms bear witness, but, like the town itself, they have witnessed more flourishing times. They are ludicrous specimens of their race, and stand with their branches projecting straight upwards into the air, giving them the appearance of gigantic brooms. . . ." (pp. 33–34).

". . . In order to reach Meshed Ali, it is necessary to cross the marsh; for this purpose boats are always to be procured at Keffil. They are heavy, clumsy vessels, constructed of Indian teak, about 40 feet in length, with high pointed prows and sterns, and flat bottoms, for enabling them to skim over the shallows. Each is guided by two nearly naked Arabs, one of whom manages the cumbrous and primitive rudder, while the other attends to a huge lug-sail, if such a term can be applied to a patchwork of every shape and colour, filled with innumerable holes.

"The stream flows, at the rate of four or five miles an hour, through a continuous rice field, which is prevented from being completely overflooded by means of dams constructed of stakes and reed matting. Sometimes, when the rise of the Euphrates exceeds it usual level, the country is a vast inundation. On such occasions whole families of Arabs, with their frail dwellings of reeds and tents, are swept away in a single night. These calamities are but too frequent. Upon a few elevated spots small mud forts serve as citadels for refuge in case of inundation or attack. The Arab inhabitants of these marshes are a fine manly race, and their noble forms are particularly striking. Their half-naked and deeply-bronzed bodies, nourished by scanty fare, show every muscle to advantage as they propel their vessels with long poles in the shallows against the wind or stream, dexterously running along the edge of the boat. The keffieh, or head-dress, is useless among these marshes, for the long, thick, streaming hair of the Khuzeyl Arab acts as the most natural covering, and is admirably adapted for keeping off the rays of the sun.

"In sailing along, every now and then we encountered a noisy party in a crowded boat, who gazed with wonder, not unmixed with alarm, upon the European fleet. All appeared life and activity around us in those fens, the men not languidly smoking their pipes like the dwellers in cities and loungers in bazaars, but busy at their daily employments, as agriculturists should be. The women were engaged about their tents with duties not less arduous than those of the stronger sex. Notwithstanding their labour and activity, they are evidently in a wretched state of misery, and ground down by heavy exactions. . . . ." (pp. 38–29).*

The same author writes of the Hindieh canal (which he suggests follows the line of the ancient Pallocopas) and of the Sea of Nedjef as follows:—

"The mouth of this interesting canal is situated about two miles below the Khan at Musseib, and about 16 miles above the commencement of the existing ruins of Babylon, at a point where the natural channel of the Euphrates makes a slight eastern bend. When greatly flooded the violence

* Mr. Layard describes the scene late in 1849 from Birs Nimrúd, looking towards the marshes, as follows:—"In the midst of the swamps could be faintly distinguished the mat huts of the Kazail forming villages on the "small islands. The green morass was spotted with flocks of the black buffalo. The Arab settlements showed "the activity of a hive of bees. Light boats were skimming to and fro over the shallow water, and women "urged onwards their flocks and laden cattle."—(*Discoveries in the Ruins of Nineveh and Babylon*, 1853. p. 500.)

of the stream requently breaks down the artificial barriers erected to regulate the influx of water, and enlarges the entrance of the Hindieh. Immense sums of money are expended by the Turkish Government in rebuilding, repairing, and strengthening the dam, because the river has a tendency to quit the Babylon channel and to flow westward into the marshes, as in the days of Alexander. The natural effect is to deprive the eastern side of the Euphrates of its due irrigation, by reducing all the canals below the point of bifurcation; the villages become deserted and the fields uncultivated. On the western side the rice grounds of the Khuzeyl Arabs are overflowed, and cultivation is entirely out of the question. The chief revenues of Baghdad being derived from these regions, it is of the utmost importance that the equilibrium of the two branches of the Euphrates should be properly cared for.

"Soon after the accession of Abdi Pasha to the government of the province, like all his predecessors, his attention was directed to this subject. The force of the stream, caused by the extraordinary rise of the river, had carried away every trace of the former dams, and enlarged the mouth of the Hindieh to such an extent that the Euphrates bid fair to disappear into the western marshes. He therefore cut a new channel, 120 feet broad, at a short distance above the bifurcation, which relieved the pressure and enabled him to effect the building of a new and strong dam of osiers, reeds, and earth at the mouth of the Hindieh, while the quantity of water admitted into the new cut was regulated by two solid brick piers with sluice-gates 80 feet wide.

"Notwithstanding all this expense and trouble, the river in 1854 overcame all obstacles, and once more regained possession of the marshes. Flowing southwards a few miles, a deep stream 180 feet wide, with banks 10 or 20 feet high, the Hindieh enters and is lost in the great inundation extending on the north and west of the Birs Nimrúd, passes Keffil and the ruins of Kufa, and ultimately debouches into the great inland fresh-water sea of Nedjef.

"No modern traveller has yet succeeded in following the entire course of the ancient Pallacopas, but traces of its channel are still visible on the east of the town of Nedjef.

"The great sheet of water, the Bahr-i-Nedjef, extends 40 miles in a south-easterly direction, and at its southern extremity gives out two considerable streams, Shat-el-Khuzif and Shat-el-Atchan, which subsequently unite, and are known by the latter name. Further to the south, five large bodies of water have their origin from the Atchan, and, uniting, constitute the Huran. This, after flowing about 30 miles, eventually joins the Atchan, and the two rivers form what is called the western or Samava branch of the Euphrates. All the above branches are navigable when the mouth of the Hindieh is open, and it is by them that merchandise is conveyed from Busrah to Hillah. When the great annual rise of the Euphrates occurs, the whole region from the Bahr-i-Nedjef to Samava is one continuous inundation, called the 'Khor Ullah,' or marshes of God. Here and there it is dotted with thousands of small islands, separated from each other by an infinity of streamlets. It was amid the innumerable channels of these *Paludes Babyloniæ* that Alexander was overtaken by a storm, and all but lost during his sail down the Pallacopas.

"It is only when the mouth of the Hindieh is opened by the destruction of the dams that the modern traveller is enabled to see the *Paludes Babyloniæ* as Alexander saw them. When, however, the Hindieh is closed effectually for a time, the Khuzif and Atchan cease altogether to exist, and the town of Samava is supplied by two small canals derived from the Hillah branch of the Euphrates, near Diwanieh. Such was probably the case during the labours of the officers in the Euphrates expedition under Colonel Chesney, as the streams flowing from the Bahr-i-Nedjef are not laid down on any map. Instead of them, however, there is the course of an extinct river-bed passing east of the Bahr-i-Nedjef to Semava, which may represent the Pallacopas of Alexander in a portion of its course" (pp. 42–46).

Among certain of the villages amidst the Hindieh marshes, in 1867, after an excessive flood of the Euphrates and inundation of the marshes, plague, which was believed to have disappeared from Mesopotamia for 33 years, reappeared. The population of the Hindieh district at this time was estimated, officially, at 50,000, but the inhabitants of five villages only were ascertained to have been affected by the disease. The total inhabitants of these villages did not exceed 1,000, and the deaths among them from plague, it is believed, were not less than 300. The disease ceased in June. The symptoms of the malady, as summed up by one of the Sheikhs of the infected villages to Dr. Paduan, the Superintendent of the Ottoman Sanitary Administration in the pashalik of Bagdad, were, "ardent fever, intense thirst, delirium, swellings in the "parotids, in the armpits, and in the groins, then black circles appeared upon various "parts of the body, ending in sloughs." In one case investigated by Mr. Colvill, Surgeon to the British Residency, Bagdad, there had been bloody vomit; in another case seen by him, diarrhœa with bloody stools was stated to have been an early symptom.*

* Accounts of this outbreak of plague, from which several of the details in the text are taken, have been published by Dr. E. D. Dickson, the Physician to H.M. Embassy, Constantinople (*Transactions of the Epidemiological Society of London*, Vol. 3, Pt. 1, p. 143); by Mr. Colvill (Sanitary Report on Turkish Arabia, Transactions of the Medical and Physical Society of Bombay, 1871, p. 49); by Dr. Tholozan in two monographs (*Une Épidémie de Peste en Mésopotamie en* 1867, Paris, 1867, and *Histoire de la Peste bubonique en Mésopotamie*, Paris, 1874; and by Dr. Naranzi, Secretary to the General Board of Health of the Ottoman Empire (*Rapport sur l'Épidémie de Hindié dans l'Irak-Arabi, en* 1867). Dr. Naranzi, under instructions from the Board, visited the scene of the outbreak several months after the cessation of plague, and, as the results of the inquiry he then made, he came to the conclusion that the disease had not been plague, but a malarial typhoid fever, which he designated *typhus loimoïde non-contagieux*. He was chiefly influenced in arriving at this

After this occurrence of plague on the Lower Euphrates nothing more was heard of the disease until the year 1871, when it appeared in Persian Kurdistan. This appearance was investigated at the time by Drs. Castaldi, Paduan, and Wortabet, the Ottoman sanitary physicians resident at Teheran, Bagdad, and Suleimanieh respectively, and by Dr. Schlimmer, of Teheran. These gentlemen were not able to penetrate into the more remote district where plague had first broken out, the surrounding communities refusing to allow them to pass, and threatening them with death if they made the attempt. But they were enabled to study the disease at Bana and other places on the outskirts of the area which had become infected. Dr. Castaldi's official report of the results of his inquiry made to the General Board of Health, Constantinople, has been published;* and Dr. Schlimmer has also published an account of the results of his investigation.† After the cessation of the outbreak, the district which had been infected was visited, under instructions from the Governor of Georgia, by Dr. Telafous, the Quarantine Director at Akhalsikh, on the Russo-Persian frontier. He was able to visit every part of the district, including the villages where plague is believed to have been earliest developed. His inquiries substantially confirmed the information which had been furnished to Dr. Castaldi respecting the beginning of the outbreak. *Persian Kurdistan, 1870–71.*

Plague in this outbreak in Persian Kurdistan appears to have first shown itself at the end of autumn 1870 or the beginning of the winter of 1870–71, on an elevated table-land lying south-east of Lake Urumiah, between the head waters of the rivers Jagatu and Tatawa, both of which streams flow into the lake named. The district had last before suffered from plague in the epidemic of 1829–35. The villages attacked not only within the locality of first appearance, but also in neighbouring localities to which the disease extended, including the town of Bana (Berozeh), are, according to Dr. Telafous, built at altitudes above the Black Sea of which the lowest (Uchtepé) is 4,540 feet, and the highest (Arbanos, where the disease seems first to have become active), 5,870. Bana has an altitude of 5,470 feet; and Akjivan, where the nature of the disease was first recognised, 5,240 feet.

The villages earliest attacked were situated in the district of Mikri. The disease is believed to have originated in a hamlet named Djoumouchan (Gamishan), which is situated at an altitude of 6,600 feet, and which at the time of the appearance of plague contained six families. When this hamlet was visited by Dr. Telafous he found but one family in it, and he simply observes with respect to it that "from the "local characteristics he could discover nothing which would explain the origin of "the disease, the springs of water being very pure, the inhabitants few, only six "families, mountain air and severe winters." Arbanos, three miles distant from Djoumouchan, is described by Dr. Castaldi as being situated in an unwholesome marshy district where rice is largely cultivated. This village contained 25 families, among whom were 77 cases of plague, 65 of which were fatal. Akjivan, in the same neighbourhood, a village of 150 families, among whom there were 160 cases of plague, 130 fatal, is described by Dr. Telafous as "built on an argillaceous calcareous soil, "possessing many excellent springs of water, but without any vegetation near the "houses, the cultivated tracts lying some distance from the village, as likewise the "graveyard. The lanes and alleys between the houses were full of filth, which is "however the usual characteristic of the Kurdish villages. The houses are not "crowded together, nor do the walls of one abut on those of another." The following descriptions of other villages early attacked by plague may also be quoted from Dr. Castaldi's report, the altitudes, population, and extent to which affected being taken from Dr. Telafous's report. Kananias (altitude 5,550 feet, families 15, attacks 12, deaths 8), "is situated at the foot of the mountain in a small arid plain, not far "from the river Jagatu. The village is formed by half-a-score houses leaning one

conclusion by the circumscribed prevalence of the disease, which he held to be inconsistent with a belief in the contagiousness which is considered to be one of the characteristics of *bubonic* plague. Dr. Paduan and Mr. Colvill, both of whom had visited the infected district before the disease had ceased, and had seen cases in various stages of its progress, were convinced that the malady was bubonic plague. The opinion of Dr. Paduan on this subject has the weight obtained from a previous acquaintance with the disease, before its apparent cessation in Mesopotamia and elsewhere in the East. The unquestioned appearance of plague in a contiguous district of the Lower Euphrates in 1874 is regarded by the Ottoman General Board of Health, which had previously been doubtful on the subject, to be confirmatory of the conclusion arrived at by Dr. Paduan and Dr. Colvill. (See note to this effect in Dr. Castaldi's Report on Plague in Irak-Arabi, 1873–74, p. 38.)

* La Peste dans le Kurdistan Persan. Rapport du Dr. Castaldi, Constantinople, 1872.

† Contribution à l'Historie de la Peste en Perse, par Joh. L. Schlimmer, Teheran (lithograph), 1874.

Dr. Tholozan has discussed this outbreak in a *Note sur le développement de la Peste bubonique dans le Kurdistan en* 1871, Paris, 1871; and again in his *Histoire de la Peste bubonique en Perse*, Paris, 1874.

" against another, with low and contracted doors and windows. Before these houses " are heaps of ordure of every kind, and also of sun-dried cakes of cow-dung used for " fuel, there being no wood in the locality. This combustible is piled up all around " the village to a height higher than the windows, and it is stored also in layers on " the roofs of the houses. Whatever is most afflicting in poverty, whatever is most " revolting in filthiness is accumulated, as if designedly, around these infected dens, " in the interior of which live, or rather vegetate, from 50 to 60 individuals, men, " women, and children. The cultivation of some plots of ground in the neighbour- " hood furnishes these unfortunates with insufficient nourishment." Of Karava (altitude 5,650 feet, families 20, attacks 40, deaths 32), another early infected village, Dr. Castaldi says: " All that I have said of Kananias is equally applicable to Karava. " The same misery, the same filthiness, the same crowding together of houses. In " half-a-score of these foul hovels, veritable burrows, live nearly 100 people."

The spring of 1870 had been one of extreme drought, and in the course of the year a fatal epizootic had occurred among sheep and ergotism among the people. The district, it is stated, escaped the disastrous famine which had affected Persia, beginning in 1870 and continuing throughout 1871; but with preceding murrain and ergotism it may be doubted, notwithstanding the statement of the official reporter to the contrary, whether the inhabitants did not suffer from actual privation in the winter of 1870–71. During the winter deep snow fell, and the villages being shut in, intercourse with each other and with the surrounding districts became impossible. Whilst the populations were thus snowed up, built in by the snow in the midst of the indescribable filth, peculiar to Kurdish villages, plague became active among the infected communities and almost extinguished several. When the spring enabled communications to be resumed between the infected villages and neighbouring villages and districts, plague spread abroad over a relatively limited area. It extended as far south as Bana, but before the close of the year it appears to have died out.

The disease as observed by Dr. Castaldi and his colleagues was characterised by ardent fever, the appearance of bubos in the armpits and groins, and on the neck, the occurrence of carbuncles in various parts of the body, and of petechiæ scattered generally over it. In the villages it spread from house to house in succession, and among families from one member to another, in fatal cases running a rapid course of from two to four days.

I subjoin Dr. Telafous's statement of the villages and towns affected in this outbreak, and of the losses occasioned by the disease in them. Dr. Castaldi mentions other places not included in Dr. Telafous's list, and his account of the attacks and deaths do not correspond with Dr. Telafous's statement. But Dr. Telafous's information being in every instance obtained upon the spot is probably the nearest approximation to the truth.

—	Names of Villages, &c.	Number of Families.	Number of Persons attacked by the Plague.		Distance in hours from Akjivan.	Height in feet above the level of London.	Height in feet above the level of the Black Sea.
			Died.	Recovered.			
1	Akjivan - - - -	150	100	30	—	6,150	5,240
2	Gamishan - - -	6	7	0	¼	6,600	5,650
3	Arbanos - - - -	25	65	12	½	6,720	5,870
4	Bibikend - - -	15	25	2	¾	6,500	5,650
5	Chahardowli - - -	60	60	20	1	5,850	5,000
6	Sarab - - - -	100	6	1	1¼	5,900	5,050
7	Gök tepé - - -	25	10	0	2¾	Id.	Id.
8	Armeni boulak - - -	200	125	20	2	Id.	Id.
9	Ak tepé - - - -	60	60	6	2½	6,000	5,150
10	Turcoman kendi - -	50	130	20	3	6,150	5,300
11	Ueh tepé - - -	200	200	50	3	5,790	4,540
12	Karava - - - -	20	32	8	9½	6,500	5,650
13	Kananias - - -	15	8	4	10	6,400	5,550
14	Bana (town) - - -	400	63	56	20	6,320	5,470
	Total - -	1,326	891	229	—	—	—

1873–74. After the appearance of plague in 1870–71 in Persian Kurdistan, vague rumours of the occurrence of the disease in Kurdistan from time to time gained currency in the East. None of these rumours were confirmed, but in the winter of 1873-74 and spring of 1874 the disease broke out in three localities widely separated from each other.

It appeared in December 1873 among the Affij Arabs, occupying the marshes extending north and east of Diwanieh on the east bank of the river Euphrates, nearly opposite the scene of the outbreak of 1867. About the same time the disease appeared in North Africa among certain tribes of nomadic Arabs then encamped on the Cyrenaic plateau, in the province of Bengazi (Tripoli), within the area of the outbreak of 1858. A little later, if not contemporaneously, it broke out in the Assyr country, Western Arabia.

1873-74.—The Lower Euphrates.

On the east bank of the river Euphrates, opposite the southern extremity of the district occupied by the Hindieh marshes on the west bank, is the "Mighty Marsh," inhabited by the Affij Arabs, the first of a series of great marshes which extend to the junction of the Euphrates with the Tigris. Opening into the northern portion of this marsh is the Dagarra Canal, a great irrigation channel of which the neglected and ruinous ramifications doubtless contribute to the formation of the marsh. When the river is in flood the water pouring through this canal covers the marsh and the adjacent country with an extensive inundation. What has been said of the Beni Taraf Arabs and their habitations, means, and food, in the Hindieh marshes, applies equally to the Affij Arabs.

The following extracts are from Mr. Layard's description of the marsh occupied by the Affij Arabs. He visited the tribe at the beginning of 1850, approaching their district from the north :—

"We now came to the borders of those marshes which have now spread over the lower parts of the Mesopotamian plains. As we ascended the lofty banks of ancient canals, over which our track continually led, we saw a boundless expanse of dark green, mottled with shadows by the wind, like the ruffled surface of a lake. It seemed as if the parched desert had been suddenly turned into pastures and fields of green corn. But we only gazed upon a vast bed of tall reeds bred by the wide spreading swamps, no less a sight of desolation, neglect, and decay, than the yellow wilderness. . . .

"We had sent one of our Affaij guides to inform Sheikh Agab of our approach. I had not been long seated in my tent when suddenly a number of black boats, each bearing a party of Arabs, darted from the reeds and approached the shore. They were of various sizes. In the bottom of some, eight or ten persons sat crouched on their hams ; in others, only one or two. Men standing at head and stern, with long poles of great lightness, guided and impelled them. The largest were built of teak wood, but the others consisted simply of a very narrow framework of rushes covered with bitumen, resembling probably 'the vessels of bulrushes' mentioned by Isaiah. They skimmed over the surface with great rapidity . . . .

"The tirada in which I sat was skilfully managed by two Arabs with long bamboo poles. It skimmed rapidly over the small lake and then turned into a broad street cut through green reeds, rising 14 or 15 feet on both sides of us. The current where the vegetation had thus been cleared away, ran at the rate of about two miles an hour, and as we were going towards the Euphrates was against us. We passed the entrances to many lanes branching off to the right and to the left. From them came black boats filled with Arab women carrying the produce of their buffalo herds to the Souk or market. As we glided along we occasionally disturbed flocks of waterfowl, and large kingfishers of the most brilliant plumage seated on the bending rushes watching their prey. Herds of buffalo here and there struggled and splashed among the rushes, their unwieldy bodies completely concealed under water and their hideous heads just visible upon the surface. Occasionally a small plot of ground, scarcely an inch above the level of the marsh and itself half swamp, was covered with huts built of reeds, canes, and bright yellow mats. These were the dwellings of Affaij, and as we passed by troops of half-naked men, women, and children issued from them, and stood on the bank to gaze at the strangers." (*Discoveries in the Ruins of Nineveh and Babylon.* 1853. pp. 549, 551–553.)

Mr. Kennet Loftus, who visited the Affij Arabs in 1854, thus describes the same marsh and its occupants :—

"We had now reached the commencement of those immense marshes which extend almost uninterruptedly to the Persian Gulf, and which, as I have previously said, cause the country under their influence to be a complete *terra incognita*. The swamps occupied by the Affej Arabs stretch, during the low season, from the Euphrates on the west, into the very heart of the Jezireh, and in some places even join those of the Tigris. It is impossible to state their area ; but it is calculated that they support a population of 3,000 families, who pay an annual tribute of 100,000 piastres (about 900*l.*) to the Pasha of Baghdad. Abdi Pasha, however, thinking they were able to bear a considerable increase of taxation, proposed to double the above sum for the following year. The Affej were in no small state of fermentation and alarm, complaining bitterly of the treatment they had at various times received from the authorities of Baghdad. Nedjib Pasha had twice blown their fragile towns about their ears with cannon. These consist entirely of reed huts, the reeds being tied in large bundles and neatly arched overhead. This primitive construction is covered externally with thick matting impervious to rain. The riches of the Affeji are indicated by rows of huge reed cylindrical baskets, containing the grain upon which they subsist. Rice is produced in great abundance along the edges of the marsh ; but the whole of their fields were, at the season of our visit, and for a third of the year, entirely under water. Communication is kept up as on the marshes of

the Hindieh, by means of long, sharp, pointed terradas, constructed of teak, and measuring twelve or fourteen feet long, by a yard in width. The Affej tribe is divided into two nearly equal parts, governed by two brothers, Aggab and Shkyer, the former beingt he accredited head of the whole."—(*Chaldæa and Susiana*, pp. 91–92.)

Plague was first observed at the end of December 1873 in the village of Dagarra, and the corpses of those who died earliest from the disease were carried to Nedjef for burial. The disease extended to others of the Affij villages, and in April attacked Diwanieh. Afterwards it spread irregularly in the district on the west bank of the river intervening between that town and Hillah on the north, and Kerbela and Nedjef on the west, overlapping in short the scene of the outbreak of 1867.

This outbreak was investigated for the Ottoman General Board of Health by Dr. Castaldi, and his report of the result of his investigation has been published by that Board.* Dr. Castaldi estimates the population of the infected district to have been 80,700, and the deaths from plague during the three months April, May, and June 1874 to have been 4,000. Of these deaths upwards of 2,000 took place in Dagarra and the surrounding villages of the Affij tribe, of which the population is estimated at 35,000. The following table is constructed from the data given by Dr. Castaldi :—

Towns and Districts.	Population.	Time of Prevalence.	Stated Deaths.	Remarks.
Dagarra, with Haffytch and the villages of this district.	35,000	Dec. 1873—June 1874 -	2,000	—
		1874.		
Diwanieh district - -	6,000	13 April—9 June -	194 600	Probably 1,200 deaths.
Hillah - - - -	20,000	13 May - - -	5	—
Sultan Mansour and Djerbolá -	1,500	17 May—13 June -	82	—
Hum-el-Bahrour - -	1,500	- - - -	8	All imported cases among a body of police.
Tueritch - - -	2,000	10 May - - -	1	—
Nedjef - - - -	4,000	1 May - - -	22	Deaths among Persians unknown.
Midhadieh - - -	700	April—May - - (18 days)	120	—
Kerbela - - -	10,000	25 June - -	3	—
		Stated total deaths -	3,035	
		Estimated deaths -	4,000	

Discussing the distribution of the disease Dr. Castaldi especially draws attention to the exemptions of Hum-el-Bahrour, Nedjef, and Kerbela, notwithstanding introduced infection, especially in the first-named place, and the presumably favourable conditions existing in the two sacred cities for the maintenance and diffusion of infectious maladies. He also comments upon a peculiarity of the symptoms, particularly as observed at Dagarra (these in other respects not differing from the symptoms observed in the outbreak of 1870–71 in Persian Kurdistan), namely, frequent bloody vomit at the beginning of the disease, the cases thus affected dying within 24 hours, before the development of buboes. Bloody vomit has been noted in the case of plague recorded by Mr. Colvill during the outbreak of 1867. This symptom is not mentioned in the account of the outbreak in Persian Kurdistan, but it will be again noted in the outbreak of the year under consideration in the province of Bengazi, about to be described.

1874.—Bengazi Province.

The outbreak of plague in the province of Bengazi, in 1874, was investigated by Dr. L. Arnaud, one of the physicians in the service of the Ottoman General Board of Health, and a detailed report of the results of his inquiry has been published by the Board.† The disease appears to have been limited solely to the nomadic Arabs frequenting at the time of its appearance and prevalence the Cyrenaic plateau. The existence of plague was first observed in April 1874, but Dr. Arnaud is of opinion that cases had occurred several months before. The outbreak had been preceded by three

* La Peste dans l'Irak-Arabi en 1873–74. Rapport du Dr. Castadil, Dèlègue Sanitaire en Perse. Constantinople, 1875.

† Essai sur la Peste de Benghazi en 1874. Rapport du Dr. L. Arnaud, Constantinople, 1875.

years' privation arising from failure of crops in the successive years, consequent upon persisting drought. In the winter months of 1873–74 the famine had become so severe that persons might be seen hunting for undigested grain in the dung voided by camels. The cold season of 1873–74 and spring of 1874 had been unusually wet and had converted some of the favourite camping grounds of the nomadic tribes, as in the valley of Merdj, into swamps, adding to the misery of the starving population for the time being, but rendering secure the summer crops. Mr. F. Henderson, H.M. Vice-Consul at Bengazi, who had passed through Merdj in April, states that he found there "the greatest misery, the wretched inhabitants subsisting principally on wild artichokes, and the village was almost unapproachable owing to the continuous rains "having converted the plain on which the village is situated into a vast marsh." He states also that the famine which had followed upon the long-continued drought had decimated the population of Bengazi and the Bedouins of the plain; and that it was no uncommon thing at this time to find in the morning three or four corpses in the streets of Bengazi of persons who had perished miserably over night.*

At the crisis of misery, as it were, plague appeared in a diffusive form, and spread from encampment to encampment and to certain of the villages and monasteries in the highlands, but not to the two towns of the littoral or apparently to the tribes in the low-lying plains. Dr. Arnaud was able to follow the movements of the disease in some detail, noting its dissemination through the inter-communication of the occupants of various encampments, and showing a period of latency after exposure to infection in three cases of 5 days, in one case of 6 days, and generally a limit of 8 days.

In this outbreak, as in that among the Affij Arabs previously described, bloody vomit and a blackish vomit are noted among the early symptoms. Buboes and carbuncles were almost invariably observed; petechiæ generally; boils rarely. The fatal cases ran a rapid course of from two to four days.

The following is Dr. Arnaud's tabulated summary of this outbreak:—

Tribes and Localities.	Beginning and Duration of Disease.	Population.	Attacks.	Deaths.	Recoveries.	Free from Seizure.
Orphas	5 April—1 month	34	10	7	3	24
Ferig-el-Hassan	7 April—4 months	62	55	22	33	7
Kefauta	17 May—1½ months	75	50	25	25	25
Environs of Kefauta	22 May—1 month	57	39	17	22	18
Merj	28 May—2 months	310	270	100	170	40
Segha	1 June—1 month	3	2	2	—	1
Toukra	3 June—2 months	16	13	6	7	3
Aït-Zekri	12 June—2½ months	32	29	11	18	3
Aït-Brakta	Do. do.	33	27	7	20	66
Aït-Ahmet-Kméil	15 July—2 months	38	31	11	20	7
Aït-Abides	24 July—1½ months	74	7	0	7	7
		734	533	208	325	201

Dr. Laval, a French Army Surgeon, resident at Bengazi, and who had observed the plague there in 1858, visited Merdj at the request of the Governor of the province, early in the outbreak, in order to ascertain the actual character of the disease which had manifested itself in that place, and of which the nature was then doubtful. In the course of his investigation, which made it clear that the malady was true bubonic plague, he unfortunately contracted the malady and died after a very short illness.

1874.—The Assyr Country, Arabia.

The outbreak of plague in the Assyr country, North Yemen, Western Arabia, in 1874, was investigated by Dr. Pasqua, the Inspector of the Ottoman Health Department at Jedda. He started inland upon his mission, from the port of Confodah, early in September, travelling by way of the villages of Halli and Mikaiel. The following is a summary of the results of his inquiry, as given by Dr. E. D. Dickson in a letter dated 12th February 1875, addressed to Her Majesty's Ambassador, Constantinople, and which contained the substance of a report on the subject by

* Letter to *The Times*, 19th August 1875.

Dr. Buez, the French Vice-Consul at Jedda, communicated by the Ambassador for France at Constantinople to the Ottoman General Board of Health :—

"Constantinople, Feb. 12, 1875.

"Towards the end of July 1874 Dr. Pasqua, inspector of the Health Department at Jeddah, was informed by the Governor-General of the Hedjaz that a malady resembling the plague prevailed at 'Doga,' a village containing from 200 to 250 inhabitants, placed at the foot of the 'Assyr' mountains, one day's march S.E. of Leeth, and four days S. of Mecca.

"A little later, on inquiry, Dr. Pasqua found that it was not at Doga that the outbreak had occurred, but among the 'Beni Sheir,' a tribe inhabiting the table-land of the Assyr.

"As soon as this was ascertained measures were taken by the Governor to prevent the infected locality from communicating with the healthy, and a quarantine station was established at 'Bin-Omar,' about three hours distance from Mecca. All maritime arrivals from the coast of Yemen were put into five days' quarantine at Jeddah, and were subjected to a medical inspection before receiving pratique. Inquiries were, moreover, addressed to the Medical Superintendent of the military hospital at Mikaiel, the garrison station of the district, for information regarding the malady ; and in the beginning of September, Dr. Pasqua went to Confuda, and from thence proceeded into the interior, in order to visit the seat of the outbreak.

"Confuda, the principal port of Yemen, and, Halli, a village beyond it, as well as Mikaiel, were all perfectly healthy ; and the 80 patients lodged in the military hospital there presented no symptom whatever of any contagious or epidemic disease.

"On leaving Mikaiel the land gradually rises as you advance towards the 'Sinan' mountains, whose summits attain a very considerable elevation, and it is on the slopes of these mountains that the Assyr population dwells.

"The Assyr country, properly so called, is therefore between Nejd, Hedjaz, and Yemen. It is a vast territory covered with mountains extending from the 17th to the 20th degree of N. latitude, bounded on the N. by the torrent of 'Tabalah,' on the N.E. by that of 'Bysheh,' and on the S.W. by the Red Sea. Its population is reckoned at 60,000, a warlike race, subdued for the first time by the Turks in 1870.

"The lowlands are called 'Tehama,' a name also applied by the Arabs to denote the sandy plains extending between the Red Sea and the mountains all the way from Akabah to Aden.

"That part of the Tehama traversed by Dr. Pasqua offers a poor aspect, and its villages are mean, consisting of mud huts. Even Halli and Mikaiel, the two most populous, present a wretched appearance. The hospital at Mikaiel, however, is well kept. The 'Beni Sheir' are part of a tribe of 800 to 1,000 souls, spread over the Assyr mountains in encampments distant 10 or 12 days S. from Mecca, six days S.E. from Confuda and Leeth, and only three days from Mikaiel.

"The outbreak commenced about the end of March 1874, and continued in a *sporadic* form until the middle of July, when it became violent, and raged epidemically during the remainder of that month and the month of August, and assumed a decidedly contagious and spreading character.

"Such of the natives as had seen the *Plague* of 1853, which had committed great havoc in Arabia,* declared the present outbreak to be the same disease. The first locality attacked was the village of 'Ali-Saadi,' inhabited by 325 persons, of whom 100 perished within six weeks, viz., 40 men, 25 women, 15 boys, and 20 girls. The next village visited by the malady was that of 'Ali-Dogmain,' composed of 500 souls, of whom 50 died, viz., 10 men, 12 women, 20 boys, and 8 girls. At the same time the village of 'Dogmain,' of 715 inhabitants, was attacked, giving a death-rate of 30, viz., eight men, six women, 12 boys, and four girls. Then followed the village of 'Ali-Marabi,' containing 210 persons, which gave 40 deaths, viz., 12 men, eight women, eight boys, and 12 girls, and so on.

"Most of these villages are situated on an elevated table-land called 'Toumouna,' rising about 2,000 metres above the sea and 1,500 above the 'Tehama,' and extending as far as the 'Namaz' range, from which it is separated by the valley of 'Waba.'

"Here a marked contrast is seen between the barren, wretched plain of Tehama and the fertile, pleasing aspect of the Toumouna plateau. The villages just named are built of stone ; the houses have several stories, are well-aired and properly distributed, and the soil is rich and produces the best quality of Yemen coffee, often giving two crops in the same year. Indian corn, dhurra, barley, and indigo are cultivated ; vegetation thrives and fruit trees abound. Running water is scarce, but in lieu of it the inhabitants are supplied with wells and cisterns.

"The low country, on the other hand, is sterile and marshy, and has an elevated temperature. Dr. Pasqua's thermometer indicated there 36° (Reaumur ?), while on the plateau it fell to 14°, and the air felt keen and chilly. Malaria fevers are absent in these elevated regions, and the prevailing complaints have a catarrhal tendency.

"The outbreak prevailed at first on the plateau of Toumouna, from whence it extended to that of Namaz, and even went beyond it as far as within four days' reach of Mecca. It then retraced its course and died out to the village of Namaz.

"When Dr. Pasqua visited Namaz on the 20th Sept. he only saw five cases of the malady, all more or less in a state of convalescence, yet as they were all marked with characteristic glandular swellings, he concluded it to have been the plague.

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* Dr. Buez, in a paper on the subject published in the *Gazette Hebdomadaire de Médecine et de Chirurgie* (1875, p. 52) says, in reference to this point, "Pour les habitants qui avaient observé cette maladie en 1816, "puis en 1853, où elle avait fait d'assez grands ravages, c'était la peste bubonique."

"The village of Namaz is composed of 46 houses, containing a population of 280 inhabitants, and a garrison of 135 zaptieh (police force). The Kaimakam (Lieutenant-Governor) of the district resides here, while the Mutessarif (Governor) of the Assyr lives at Mikaiel.

"On quitting Namaz Dr. Pasqua left there Dr. Agop Effendi, who had been detached from the hospital of Mikaiel for this purpose, and after returning to Jeddah he was informed by the Vali (Governor-General) of Yemen, who had made a tour of inspection in the Assyr, that the outbreak had entirely ceased. This news was, moreover, confirmed by a report from Dr. Agop Effendi dated on the 22nd October, on the receipt of which by Dr. Pasqua the quarantine applied at Jeddah and Mecca on arrivals from Yemen was removed.

"The public health at Mecca was carefully watched all the while. No untoward event occurred there, either amongst the natives or amongst the pilgrims.

"On former occasions plague visited the Beni Sheir, viz., in 1816 and in 1853. In 1816 it was brought there by the Egyptian army, but to that of 1853 no origin has yet been assigned, and Dr. Pasqua believes that the late outbreak is due to a like cause, and he discards the idea of its importation from elsewhere, because the inhabitants of these elevated regions do not mingle with those of the lowlands, and, being Wahabbis, are thus excluded from intercourse with the true believers."

To this interesting account Dr. Dickson adds a remark made by Dr. Parznichi, in a report to the Central Health Department, dated from Djerzan, in Arabia, on the 18th December 1874, that "the localities lately attacked by the outbreak of plague had been previously visited by famine."

1875.—The Lower Euphrates.

On the 24th March 1875, Dr. Paduan telegraphed from Bagdad to the General Board of Health, Constantinople, that several fatal cases of plague had occurred at Diwanieh, on the Lower Euprates, "since the month of December." As already related, Diwanieh was within the district in which plague had been prevalent in the spring and summer of 1874, and the town had then suffered somewhat severely from the disease. On the 12th April, Dr. Paduan again telegraphed to the Board that two days before cases of plague had been seen by a military medical officer stationed at Samava, south of Diwanieh, while on a tour of inspection, in a place called Umulnidjrin; and also that the Mutessarif of Hillah had reported that the disease had spead to Shinafieh, on the eastern border of the Bahr-i-Nedjef. A cordon sanitaire had been placed round the district of Samava, and the huts in which the cases had occurred at Umulnidjrin had been burned. Dr. Paduan added an expression of opinion that this appearance of plague was a continuation of the previous year's outbreak.

The cases of plague reported in the district of Samava and the appearance of the disease at Shinafieh were the commencement of an extension which spread over the districts, on both sides of the Euphrates, immediately south of those which had been affected in 1874. On the west bank of the river the malady spread throughout the district lying between the stream and the Sea of Nedjef; and on the east bank it spread throughout the district which lies in the angle formed by the Shat-el-Hai and the Euphrates, and along the whole course of the river Hai to the Tigris. This district is inhabited by the Montefik Arabs. The disease appears to have occupied a wider area in 1875 than in 1874, but the mortality it occasioned in the first-named year as compared with the last-named year is not yet known. Immediately on the news of the appearance of plague in the Samava district reaching Constantinople, the General Board of Health there gave instructions for a medical commission to proceed from Bagdad to the infected district. The *ad interim* reports only of this commission have as yet been communicated to this Department. Surgeon-Major Colvill, attached to the British Residency at Bagdad, under instructions from H.M. Consul-General and Political Agent there, also visited the infected district. I append so much of the report prepared by Mr. Colvill on the results of his visit as is necessary for the purpose of this memorandum. The report is of peculiar interest and value from the account it gives of the localities traversed on the Euphrates and the state of the river between Lamlum and Samava, and for the information it contains regarding the prevalent disease.

In December 1875 a few cases of a bubonic malady, presumably plague, were reported by the Saniary Administration at Bagdad to have "occurred at Azizie, near "It Hané," on the Euphrates.*

1876.

At the beginning of the present year (1876) plague again became active in Mesopotamia. The re-appearance of the disease there was announced in the third week of February; but the disease had been present in that town on the 1st January, one

[* This was an error; the Azizie referred to is situated on the Tigris. See the 4th foot note, Memo. No. 2.—J.N.R.]

death from it having been recorded on that day, and not less than 50 deaths from that date to the close of the month. A telegram from H.M. Representative at Constantinople to the Principal Secretary of State for Foreign Affairs, dated 17th March 1876, states "that plague is increasing in Mesopotamia and that there have been five cases "in Bagdad itself."

APPENDIX TO FOREGOING MEMORANDUM.

Report by Surgeon-Major Colvill to H.M. Consul-General and Political Agent, Bagdad, on Plague in Mesopotamia, 1874–75.

Mr. Colvill on Plague in Mesopotamia, 1874–75.

"Bagdad, June 5, 1875.—I have the honour to report my progress along the Euphrates in search of plague. In order to make myself understood it will be necessary to give some account, but so far only as my present object is concerned, of the line of country travelled (for it is practically unknown to us), and if possible to append a rude plan, for all the maps I have seen are not only deficient, but misleading; towns are marked in large characters which have now no existence, while other towns have risen which have no place on the map; large canals with extensive permanent lakes which have existed of old are a blank, and the Euphrates is traced on these maps as a large river to its junction with the Tigris, while it actually disappears between Diwaniyah and Samawah.*

"In this description of the country I will divide my route into sections from one central town to another, the first being from Bagdad to Hillah. With reference to the subject under consideration one point only in this section requires notice, and it is this, that at Musseyib, 30 miles in a straight line above Hillah, a canal leaves the right bank and carries off half the water of the Euphrates. This canal is called the Hindeah, and passes through a district having Kerbella to the west and Hillah, with the ruins of Babylon, to the east, and at Meshed-Ali (Nejef) it opens into an inland sea, 60 miles long by 30 broad, called the Bahr-il-Nejef. It was in the marshes to the west of this Hindeah canal that the plague appeared in 1867. The water in the Sea of Nejef becomes brackish, and issues by a canal or river called the Shat-il-Shinafeah, which, after taking a southerly direction for about 20 miles, branches into two, the southern branch, the one used for navigation, being called the Atshan, while the other one is called Aber-Rufoosh, and both open into the Euphrates a little above Samawah. On the right bank of the Shat-il-Shinafeah, and within sight of the dome of Meshed Ali, stood the village of Shinafeah, to be afterwards mentioned. Most of the Mahomedan pilgrims from India to Kerbella and Nejef follow up the Euphrates, the Atshan, and the Shat-il-Shinafeah, and I saw vessels of 50 tons passing.

"My second section is from Hillah to Diwaniyah. During the first two-thirds of the way by river a number of canals, varying from seven to ten yards in width, open from both banks, and end in separate small marshes. Those opening from the left bank, in the order from Hillah, are: 1, Wurdieah; 2, Rumeah; 3, Abu Hassan; 4, Fanarah; 5, Be Rumanah; 6, Lanadal; 7, Shomlie; and, 8, Abu Chumach. Those from the right bank, in the same order, are:—1, Michereah; 2, Homaneah; 3, Alach; and, 4, Jerboeah. All these canals are farmed from Government by merchants in Hillah, and the cultivators reside permanently in Hillah, and live only by the canals in tents or reed huts while they grow the wheat and barley. No more canals open from the right bank of the river, but one-third from Diwaniyah, and therefore two-thirds from Hillah, on the left bank, is the opening of the Dagarah canal. This canal is 60 to 80 yards wide, and of considerable depth, and runs almost due east for 12 miles to the foot or enclosure of Dagarah. Its banks are some feet higher than those of the Euphrates, and there are numerous cultivators on both sides, who have to raise the water for irrigation in skin buckets drawn by horses or oxen. Their habitations being close to the canal are therefore on dry ground. At the fort of Dagarah the canal divides into three or four, but these quickly give off branches which run over ground lower than the surface of the water. This ground is used for the cultivation of wheat, barley, or rice, and the cultivators, who are all permanently settled, occupy reed huts built on ground saturated with moisture. Eight miles more and these waters again collect into a reed-bearing marsh, 22 miles long and 10 broad, but with a large space of open water in the centre. At the eastern end this marsh forms minute canals, which quickly join, becoming larger and fewer till at the village of Afiche they form one large canal, called the river Micherie. This is the district of Afiche. As at Dagarah, its ground is lower than the surface of the water, and its inhabitants permanently dwell in huts built on ground saturated with moisture. Twelve miles along the river Micheri is the village and small district of Abdare, exactly of the same nature as regards cultivation, irrigation, and habitation as Dagarah or Afiche. And now the canal takes the name of the river Karr, and bends round, as may be seen on an ordinary map, and opens into the Euphrates a little above the opening of the Shat-il-Subil (Shat-il-Hai). These canals closely resemble the arterial system; the Dagarah canal bearing the muddy water of the Euphrates represents the artery dividing and subdividing, while the marsh is the capillaries, for here all the mud is deposited, the water becomes perfectly clear, but acquires a deep black tint from the carbon of decayed vegetation and a strong marshy flavour; the river Micheri, which carries off the water, is of course the vein. A process something of this nature also happens in the Sea of Nejef, and it will be seen that almost all the solid particles of the whole of the waters of the

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* I have substituted for Mr. Colvill's rough map, a map based on actual survey. See Map I.—J.N.R.

Euphrates are precipitated before that river joins the Tigris, but what it gains in clearness it loses in flavour and quality. Six miles above Diwaniyah, at a place called Abu Fadal, another canal, 30 yards wide, opens from the left bank of the Euphrates, and runs in a south-easterly direction through the intermediate ground between the river Karr and the Euphrates. After a course of about 30 miles it opens into a marsh, and here is the village of Fowar, with its surrounding marsh district. As to cultivation, irrigation, and habitation, Fowar is the same as Dagarah or Afiche. The water of this canal is nearly all absorbed by marsh and cultivation, but a small stream from the marsh opens into the Euphrates between Samawah and Al-Khudhr. The town of Diwaniyah, built almost entirely of sun-dried bricks, is situated on both sides of the river, which is crossed by a bridge of boats. The population is about 2,500, consisting, besides the government officials, chiefly of shopkeepers for the supply of the surrounding villages, and of agents for the purchase of wool and grain. There are besides two regiments of infantry, a battery of artillery, and usually a regiment of cavalry, said to be necessary in order to collect the revenue.

My third section is from Diwaniyah to Samawah. From Diwaniyah, half-way to Samawah, the country is without a tree, without cultivation, without a canal leading off, save one, and that very small, in the direction of Fowar, with no brushwood thicker than the finger or more than 2½ feet high, and not an inhabitant, save a few tents, 200 in all, of black hair of the Garoul. These are Bedouins, who wander about on both sides of the river, and though they will not condescend to till the ground, they carry the grain from the country to town on their numerous camels. At this half-way, however, two miles inland from the right bank, is the solitary tomb of Humza, a son of Kauthem. Not a soul lives near it, but there are four guardians appointed, who take it week about to watch the tomb. A little further on, however, on the left bank, is the village of Humza. This is quite a recent place, consisting of 80 houses on dry ground, and from this cultivation begins, but the bank being high irrigation has to be performed in skin buckets drawn by horses. Surah, Antakiah, and Lamlum, towns marked on the map, have ceased to exist. There were two Lamlums, one, on the right bank, said to contain 10,000 inhabitants; probably true, for the ruins are extensive, but it was destroyed 44 years ago by the plague. The remaining inhabitants fled to the left bank and founded the second Lamlum, which, 15 years after, was also deserted as the river altered its course. These people then divided, the smaller portion forming a village on the left bank called Um-Nejeris, within sight of Jawariyah, marked on the map, while the majority founded the town of Rumoetha, nearer to Samawah, and also on the left bank. Before reaching Um-Nejeris the banks became low, and the water, when I was there, was pouring, as it does all the spring, over rice fields as far as one could see, and Um-Nejeris itself is a village of exactly the same stamp as Fowar or Afiche.

Jawariyah, however, is different, being built on a strip of dry land comparatively high. Rumoetha is a small but well-built town, with a good bazaar, and 300 houses, on a dry situation, comparatively high, and it is surrounded by gardens, which show that the subsoil around is not so damp as to rot the roots of trees. From Rumoetha to Samawah it is nothing but rice fields and marsh, with many little villages of reed huts on the drier ground. But be it remembered that all these villages are shifted twice a year, for so soon as the water falls the huts are all carried to the rice fields, and there remain till next spring rise, which completely washes and cleans the ground occupied by these villages during the greater part of the year. So great is the drain for the rice fields, that 20 miles below Rumoetha, at a place called Abu Chelib, the demand for water is greater than the river Euphrates can supply, and a back current sets in with force, this being the brackish water from the sea of Nejef, through the Shat-il-Shinafeah and the Aber Rufoosh. So that, in fact, the great river Euphrates is lost in the rice fields at Abu Chelib. The Aber Rufoosh and Atshan having joined a large river with comparatively high banks leads to Samawah. Samawah is a town of 3,500 inhabitants, built on both sides of the river; it is, in fact, a duplicate of Diwaniyah, with this exception, that there are a number of gardens about it, and only 300 infantry and two guns.

My fourth and last section is from Samawah to Sook-il-Shiook, close to where the Shat-il-Hai opens into the Euphrates, and on the same side is the new town of Nassreah, founded five years ago by Nassr Pasha, chief of the great Montefik tribe, in order to perpetuate his name. For half the way from Samawah to Nassreah the banks of the river are comparatively high, and irrigation has to be carried on by skin buckets, the inhabitants remaining on the ground only during the growing season, and for the rest of the year living in Samawah and Al Khudhr.

Al Khudhr is a mud-built village of 200 houses, high and dry on the left bank. It surrounds the tomb of Khudhr, a son of Kathem. For the other half of the way to Nassreah, the country on the left bank is a swamp partly from the Euphrates and partly from the Shat-il-Hai. On the right bank is a desert, and the only building to be seen is a domed room, built for the prophet Jonah, who is supposed to visit this earth two or three days every year, and having been once seen here it is supposed he may return, and the room is built for his reception. Within sight of this room I was caught in a storm. It had been calm all day, but towards evening a speck appeared in the north-west, which increased alarmingly fast. Clouds of dust rolled over, and as they passed to the left took the form of ranges of hills with very bold fronts chasing one another. The boatmen, alarmed, ran their canoe into a niche in the bank; the sun disappeared; still scarcely a breath of wind. Presently there was a noise like the sea; not a roar, but the rattle of waves on the beach, and the storm came in earnest. It quickly passed, and settled into a squally night. It was probably a gust of this kind which swamped the steamer "Tigris" in Colonel Chesney's time. The town of Nassreah, of about 3,000 inhabitants, was planned by a Belgian architect. The streets are wide and parallel, or at right angles; all the houses are of mud, except the barracks, containing also the Government offices and the house of the chief. The Shat-el-Hai is a canal of the olden time, but it differs from all the

other old canals that led from the Euphrates to the Tigris in so far that its openings at the Tigris and at the Euphrates are on the same level, so much so that the current in the canal is changed with any sudden rise of either of the rivers. The Shat-il-Hai, opening from the Tigris at Kut-il-Amarah, retains its name from the first third of its way, but during the middle third it divides into two, the easterly branch being called the Shat-il-Amah, and the westerly Abu Jeheirat. These two again join, and for the last third the canal is called Shat-il-Subi. Hai Wăsut, with the direct round, contains 4,000 souls, and is situated on the Shat-il-Hai, 25 miles from Kut-il-Amarah. It is built partly of mud, and partly reed matting. Jelat Sekker, a village with its district, contains 2,000 inhabitants, and is situated on the Abu Jeheirat. The village of Shatra, with its district, contains 6,000 souls, and is situated on the Shat-il-Subil. These three villages, partly of mud and partly of reed matting, are of the same class as regards position, cultivation, irrigation, and habitation as Um-Nejeris and Fowar. Three years ago Nassr Pasha attempted making an embankment along the right bank of the Euphrates from Nassreah to Busreh, in order to prevent the country to the south being flooded; the idea was grand, but no one having the slightest notion of the force of water, with the first rise of the river the embankment disappeared, and the Arabs who were forced to work at it fled to the Shat-il-Hai, and placed themselves under the mild rule of Fahad Pasha, brother of Nassr. This is worth noting, for if plague attacks them on the Hai, they may return to their old haunts. Shook-il-Shiook, or the bazaar of the chiefs, contains 2,000 inhabitants, and is a dirty, tumble-down place of sun-dried bricks. Its chief feature is a long bazaar, which contains nothing unless the daily wants of a poor people. Sook il-Shiook is said to be falling into decay since Nassreah was built, and so dirty is it that the sooner it becomes a thing of the past the better for its inhabitants. It is about 16 or 20 hours by boat from Busreh.

Having finished the outline of my route, so far as it has reference to the subject of this letter, I shall now sketch the progress of plague. In the spring of 1874, plague appeared amongst groups of huts in Dagarah and Afiche, and it was imported from there into Diwaniyah, where 400, including the Governor's son, out of a population of 2,500, died. At the same time it appeared in Shinafeah, but whether spontaneously or by importation I cannot say. Last spring a man arrived from Afiche at Um Nejeris, and died in a hut of plague; and two to three days after his arrival, the first case of plague occurred. Four people in that hut died, all who fell ill, leaving two only untouched. In all, 20 people in a population of 500 died, and some 20 recovered. The heats having set in, the disease became dormant till last autumn, when it again appeared at Um Nejeris, and four persons died, but the greater number recovered. Plague again became dormant till the beginning of January of this year, when it was reported to exist on the Shat-il-Hai. In the beginning of February it was carried to the district of Abdare by some Montefik Arabs from the Hai, and about 150 in the district died, out of a population of 4,000 souls. The disease did not enter the village, which consists of 50 houses. About the beginning of March the disease appeared in the village of Fowar, in the heart of the bazaar, but how it was brought there I could not find out, as the first cases were concealed, and a number of deaths had even taken place before the authorities were aware of the existence of disease; and it was not till the 9th of April, when a southerly wind set in, and 40 people were seized on a Friday and Saturday, and almost all died, that the existence of disease was declared. From that time the epidemic there decreased; and when I visited the place on the 8th of May, all the cases I saw were in reed huts on the outskirts of the mud bazaar. The village of Fowar had a population of about 250 souls, and up to the time of my visit 43 were known to have died, though there were probably more deaths. On the 16th of April a man arrived from Fowar, and spent the night in a garden-house on the outskirts of the town of Diwaniyah, on the left bank of the Euphrates. He fell ill of plague, and died there. After a few days, exact time unknown, four of the gardener's family died, besides a little daughter, who was carried by the father in a dying state to a garden-house on the opposite bank of a river, and left there. He returned next night and took his child, who meanwhile died, back with him. Forty-eight hours after taking the girl to the gardener's huts on the right bank of the river, the first of this man's family was seized; there were here 15 people in all, divided into four huts: in one hut, father, mother, and son died, all it contained; in another hut a woman living by herself died; in a third hut, two girls died, leaving father and mother and one girl behind. One or two Jews went to this garden on the 28th of April, and four days after, a boy, 15 years of age, was attacked; but when I saw him on the 7th of May, he was recovering, with a bubo on the left groin, which had burst. A soldier from the barracks close by was also attacked, after entering this garden, but was recovering when I saw him. Another soldier from the barracks, after visiting a village three hours distant, towards Shinafeah, where he entered a hut, of which, to use a local expression, the doors were shut, meaning that all had died inside, returned to Diwaniyah, and died. At Shinafeah, which has a population of about 1,000 souls, 108 people died this spring, up to the beginning of May, when three-fourths of the villagers fled into the marshes, probably alarmed by 24 people dying within three days. At Um Nejeris, up to the date of my visit on the 11th of May, 60 people had been seized, out of which 40 died, and the disease still existed in the village; though from an evident dislike to my visiting the patients, the heads of the people declared that women only were attacked, and trusted I would not insist on seeing them. As I mentioned, plague appeared on the Shat-il-Hai in the beginning of January, and it then attacked the village of Jelat-Sikker, containing about 2,000 inhabitants, and after about from 460 to 470 had died, the villagers fled, not leaving twenty-five people in the place, and a few went to Kut-il-Amarah on the Tigris, where one or two of them died, thus creating alarm. At Hai Wasut, containing about 4,000 souls, up to the beginning of May 500 people had died; and when I was in the neighbourhood the disease still existed. At Shatra, the disease appeared only about the middle of April, and was increasing in the beginning of May. From Shatra, plague was

carried into Nassreah by two messengers on the 20th of April. One of the messengers died, and the other returned to Shatra. Between two and three days after the entrance of the messenger into a house in Nassreah, where he stayed, the head of that house was taken ill. Altogether, up to the middle of May, about thirty people died. At Sook-il-Shiook, the plague appeared about the middle of March, and 200 people died out of a population of 2,000, but no deaths had occurred since the beginning of May.

A triangle, with one angle at Kut-il-Amarah on the Tigris, another at Shinafeah, and a third at Sook-il-Shiook, will include the infected district, which, it will be seen, has greatly increased since last spring. It is almost impossible to give an idea of the total number of deaths in the whole district, because the natives are so given to exaggeration. But if it is supposed that half of the villages within this triangle were attacked, that the number of deaths was 13 per cent. of the inhabitants of the infected villages, and that the whole population is 12 to a square mile, this will give a little over 4,000 deaths for the two years, and I suppose it is pretty near the truth.

The symptons of this disease are fever from twenty-four to thirty hours, but often immediately before that the patient appears more than absent, rushes along the bazaar, speaking to no one, enters his house mechanically, shutting the door, and drops on to his bed as if in despair or wandering in his mind. When fever sets in, the patient becomes stupid, his eyes are red and turbid, and he looks like a drunken man, or he is delirious, and on being asked a question, only answers with a moan. His tongue is swollen, generally blackish brown, and fissured, sometimes white or yellow. There are invariable sordes about the teeth and gums; the thirst is intense, and in certain cases, if the patient is able to answer, he complains of pain in the epigastrium, as if being stabbed by a knife. In this epidemic there is very little vomiting, though, in certain cases, the patient vomited blood towards the end. The breathing is hurried, and the pulse during the fever stage is very rapid. The urine, as a rule, is natural, often pale and abundant, but as the case goes on, he often passes blood from the bladder. There is almost always obstinate constipation, and when diarrhœa appeared, it was looked upon as a good sign. When the fever left, the patient burst into a profuse perspiration, and became sensible, though very weak. With the fever, or oftener a few hours after it had set in, there was intense pain in the groin, armpit, or neck, and so sudden was the swelling of the lymphatic glands that the attendant often discovered a considerable enlargement on the first complaint of pain, and no case occurred in which the swelling of the glands was absent. The glands in the groin more frequently swelled than anywhere else, next to that in the armpit, the glands of the neck swelling more rarely than any. The glands of one groin as a rule swelled, but sometimes in both groins, and indeed anywhere, it was seldom one gland only, but a chain of half-a-dozen, one being larger than the others, round, the size of a walnut, or oval, the size of a pigeon's egg. Petechiæ occurred only in fatal cases, and then only two or three hours before death. Carbuncles did not occur this year, but appeared in Diwaniyah last spring in a certain number of patients, and were looked upon as a good sign. Death occurred from two to seven days, and if the patient survived to the twelfth day, he was considered to have escaped. The mortality in the first half of the epidemic in a village was from 93 to 95 per cent. of those attacked, but during the latter half the greater number of patients recovered; and it is to be remarked, that though plague may be decreasing, and most of the patients be recovering, when the disease is transferred to another village, still that other village fares no better, as if, from some predisposing cause, a certain number of victims are marked out for destruction, while the decrease is due, not to a diminution in the vitality of the disease, but probably to the fact that all those most liable are killed among the first. It was constantly remarked that many more people fell ill during a southerly wind than when the wind was in the north, and this is an observation that was made 102 years ago, when the plague attacked Busreh. I always lay considerable stress on the opinion of intelligent people who saw the plague in 1831–32, and all agree that this was the same disease with the exception of two men at Fowar. These two men said it was like it, but different because the carbuncles appeared, and one pulled off his shirt and showed me a large scar on his back, which had discharged matter for months after he had recovered. Again, said they, the patients then became as drunk, never recovering; while now, when the fever leaves them, they declare themselves well, often smoke, but still they die. We, however, know that carbuncles are not necessary in order to establish plague. There is one point, and before I entered those districts I was misled by it, and it is this—if this is plague, why does it spread so slowly? and it does require a visit to understand it. In the early spring, when the cultivators are ploughing and completely occupied, there is no intercommunication between one village and another, and no visits are paid from the towns, because there is no revenue to collect; and when the revenue-men do spread abroad and the villagers have less to do, the season of plague has almost ended: for I consider that between the end of May and the 10th of June it ceases, or, I should rather say, becomes dormant. In 1831, when plague ceased in Bagdad, it lingered during the summer and winter on the Shat-il-Hai, and in 1832 attacked Busreh, while but few people suffered in Bagdad that year. Here we find it last spring attacking Um Nejeris, lying dormant during the summer, appearing slightly in autumn, becoming dormant again during the severest winter that has been known in this province, and again appearing this spring. Diwaniyah, it will be noticed, suffered severely last spring, and though plague was brought to its door this spring, yet it escaped. That this is plague there cannot be the slightest doubt, but still it is a plague not properly developed; whether it will arrive at maturity next year, demands considerable thought, because Bagdad, Hillah, Kerbella, Nejef, and Busreh, lie round the infected triangle; and if this is plague in a state of incubation, be it remembered that it will be hatched much farther east than before, for all former plagues came from Egypt or Syria.

I have already, beside mentioning the town, described four classes of villages or groups of huts. One class where irrigation takes place with skin buckets on account of the high bank, and the huts

are on dry ground and therefore receive all the antiseptic influence of earth. In the second class the villagers only spend the season of cultivation on the ground and return to the towns for the rest of the year. In the third class the villagers are driven, on account of the rise of the water from their rice-fields, and forced to move their habitations twice a year, while the ground they occupy during the greater part of the year is thoroughly cleansed by the rising river. Those three classes of villages are all free from plague, and the disease is confined to the fourth class only. In this class the villages or groups of huts are permanent; they are on ground which is a foot or two lower than the surface of the water in spring, and the ground is so saturated with water that the refuse of the village is neither absorbed nor can it be evaporated, for it acquires fresh moisture from the ground, and this refuse acquires the form of a bluish-black oily fluid, which surrounds the huts and covers the paths, and stains the walls two feet from the ground; and, in fact, the village is in such a state of filth that it requires to be seen to be believed. It was this class of village which was exclusively attacked in the Hindeah in 1867. It is no exaggeration to say that every hut in this class of village is a filthy pigsty; for put the pig in in the morning, and in the afternoon he will be wallowing in the mire, so moist and polluted is the ground. It may be remembered that the towns of Diwaniyah, Nassreah, and Sook-il-Shiook have been attacked by plague, but the disease was imported, not hatched there. . . . . .

I can see no reason why it should have attacked this district last spring, and this in preference to any other year; for during the past two years every kind of grain has been in profusion, dates in abundance, and fish on the Euphrates are caught simply for the sake of the oil. It may be remarked that, during last spring, there was an excess of rain as in 1867, but that could not affect villages moist as these are. Still, it is a significant fact that the only two great inundations of the rivers since 1831 occurred in 1867 and last spring, and that during the great plague of 1831 there was an inundation of the Tigris which washed half Bagdad away. In 1867, however, the disease died away in one spring, while this year the area has much increased since last year.

. . . . I cannot conclude this Report without mentioning the exceeding kindness I received from all classes and creeds along the entire route. I seldom entered a village where I was unknown, and some one at least did not thank me for professional assistance rendered him or his relations. In fact, high and low were most anxious to serve me.

FOWAR.

May 8.

Case I.—Hassan ibn Abood, 25 years old.—His mother died yesterday, and in the afternoon, returning from the funeral, he was seized with fever, unable to walk, had to be put on a donkey, and was not brought home till midnight. Though intelligent in health, the patient appeared semi-comatose, very restless, and moaning, sometimes crying "Mother, mother," and he requires to be spoken to six or a dozen times before he can understand the simplest question. Lifted to a sitting position, the head rolled from side to side. He complains of pain in the groin. Drinks much water. There is no vomiting. The glands began swelling only within the last two hours, and now a chain of glands are swelling in the right groin. His tongue is white, furred, and swollen. He seems as if drunk. There are sordes about the gums and teeth. The breathing is 40 and laboured. Pulse 130; no petechiæ. Constipation. No headache. Passes water pale and natural. Eyes bloodshot and turbid. No perspiration, and the skin is hot. The mother and son were the only inmates of one hut.

Case II.—Mahommed ibn Mustapha, 50 years of age.—He is a coffee man by trade, and desired to open his shop the day before yesterday in the morning, but returned with fever, which has just left him, and he now perspires freely. Yesterday he felt the chain of glands enlarging in his left groin, and to-day they have increased, the largest being the size of a walnut. There is intense pain, and great headache. Tongue furred, swollen, and very white; sordes about the teeth and gums. Bowels constipated. Urine scanty and high coloured. Pulse 95. Breathing 36 laboured. Eyes clear. Patient is now very weak, but sensible. Yesterday, however, he is described like one drunk. He drinks much water. No petechiæ. Has a wife and child, but no one has previously died in his hut.

Case III.—Hajee Sultan, 35 years of age.—Four days ago returned from his shop in the afternoon with slight fever, which increased in intensity, and only left him to-day. With the attack of fever the gland in the right groin swelled. Till to-day he has been delirious. He now perspires. The glands in the groin pain intensely, but not now. The tongue is black, dry, and swollen, and cracked. There is intense thirst, and sordes about the teeth. The bowels are freely opened; in fact, he has diarrhœa, and the excrement is very offensive. The breathing is 60, but not laboured, and the pulse 96. He passes much dark urine. His eyes are heavy looking, but neither bloodshot or yellow. No petechiæ. Patient very weak. He has had no vomiting.

Case IV.—Abid, a boy 4 years old.—Yesterday afternoon had fever, and this morning a mass of glands swelled in the left axilla. He only cries out "Head, head," answers no questions, and appears to understand nothing, being quite stupid, and tossing about, and he also appears frightened. Tongue, so far as can be seen, is white and swollen. The eyes are yellow and heavy. The breathing 52 laboured. Skin very hot. Pulse 150. Last night he vomited a white froth every hour, but this has ceased. The bowels are constipated. There was no urine yesterday, but to-day once scanty and dark. There are sordes about the gums and teeth. No petechiæ. He only moans, and drinks much water.

NASSREAH.

Temperature of the air, in the shade, 93° at the time of these visits.

Case I.—Jassim ibn Moolood, 30 years of age, and a butcher by trade.—This morning at 2 o'clock he returned home like a child without sense, mechanically shut his door and dropped on his bed,

complaining of pain in the left groin. Tongue is red at the margins, white in the centre, and dry. Pulse 132, very feeble. Breathing 24. The temperature of the skin in the arm-pit, 94°. He complains of intense pain in the groin, though the glands are but very slightly enlarged, but evidently swelling. Bowels are constipated. He passed this morning about a pint of urine, with blood. The eyes are yellow, heavy, and dull. There are no petechiæ. On complaining of pain in his groin, 1½ lbs. of blood was taken from him; and, though it is said that at the moment the heat of skin left him, still he did not perspire. He answers questions with great difficulty. He is quite prostrated, and evidently at the point of death.

Case II.—Rima bint Atti, 45 years of age.—Three days ago at night she had fever, but before the fever came the glands enlarged in both groins. At present there is one gland in the left groin the size of a small orange, and the chain gradually diminishes in size. In the right groin the gland is oblong, but not so big as in the left. The swelling appeared in the left groin after it appeared in the right. Pulse 140, weak. Breathing 40, but apparently easy. Temperature of the skin in the breast 100°. Tongue red and fissured. Sordes about the teeth and gums. No headache, but moans from pain in the groins. Bowels constipated. Passed blood yesterday, twice with urine, which is natural in quantity, vomited bile yesterday, but none to-day, though she complains of bitter taste in her mouth. She answers questions readily, but when raised complains of giddiness in the head, as if a knife was stabbing her in the epigastrium. The eyes are yellow and heavy. No petechiæ. She perspires freely, and does not drink much water.

Case III.—Zafaran, a female negro slave of an officer, 18 years old.—Yesterday at seven in the morning she said she could not work, and immediately the glands in the right groin swelled. She spoke once or twice yesterday, but not since. Pulse 147. Breathing 42, laboured. The temperature of the skin in the arm-pit 96°. On being spoken to, she only answers with a moan. Mouth half open, tongue slightly protruding. There are sordes about the gums and teeth. The bowels are constipated. She passes urine involuntarily. Last night it was yellow, but to-day it is red, as if mixed with blood. She is too comatose to open her eyes or show her tongue.

Case IV.—Salaman ibn Jaffer yesterday afternoon was seized with headache and fever. There is no enlargement of the glands. The tongue is furred, white in the middle, and red round the margins. Urine yesterday pale and abundant. Pulse 120. Breathing 36 easy. Temperature of the skin in the arm-pit 99°. He perspired freely all night, and this morning complained of a sharp pain in the epigastrium. The eyes are white and clear. He drinks much water, but cannot taste it in his mouth. He answers questions quite readily, and in fact it does not appear a case of plague, though the attendants say it is.

I was on my way to see another patient, when I was told that he had just died, after three days' illness, and unfortunately was carried to the grave before I got there.

MEMORANDUM No. II.—1875-76 and part of 1877.

(*From the Report of the Medical Officer of the Local Government Board for* 1876.)

RECAPITULATORY.

This Memorandum relates to the progress of Levantine plague in 1875–76, and part of 1877. In a Memorandum which I prepared last year, and which is printed in the Appendix to the last report of the Medical Officer (New Series, No. VII.), I described the several re-appearances of plague which had occurred since the apparent extinction of the malady in 1844. These, as it will be useful to recall here, were eight in number, namely, (1) the re-appearance in Western Arabia in 1853; (2) in the province of Bengazi, Tripoli, 1858–59; (3) in the extreme north-west of Persia (district of Maku, Persian Kurdistan), 1863; (4) among the Arabs inhabiting the Hindieh marshes, on the right bank of the Lower Euphrates, in 1867; (5) in the tract of country lying to the south of Lake Urumiah, Persian Kurdistan, 1871; (6) in the province of Bengazi (Tripoli) again; (7) in Western Arabia, also again; and (8), among the Affij Arabs occupying the great marsh on the left bank of the Lower Euphrates, north and east of Diwanieh, in 1873–74.

Plague in Mesopotamia. The Lower Euphrates, 1873–74.

The appearance of plague on the Lower Euphrates in 1873 was the beginning of an outbreak of the disease which, extending its area of prevalence from year to year, has probably not yet come to an end, and which in the course of the past year (1876) involved a part of South-western Persia as well as Mesopotamia.

Briefly to recapitulate the facts of the beginning and development of this outbreak, I may mention that the disease was earliest observed towards the close of 1873 among the Affij Arabs, who inhabit the first of the series of great marshes which exist on the east bank of the Euphrates below Hillah. It prevailed chiefly among the Affij villages, but extended to both banks of the river, attacking Diwanieh, and spreading among the villages lying between that town and Hillah. Several cases occurred in Hillah, and the two sacred towns of Kerbela and Nedjef, on the borders of the Syrian desert, came within the limits of the infection; Nedjef suffering from it to a greater extent than Kerbela. Dr. Castaldi, the Ottoman Sanitary Delegate in Persia (who investigated the outbreak in 1874 for the Ottoman General Board of Health) estimated the mortality from plague in the infected district during the last three months of its prevalence that year, namely, April, May, and June, at 4,000. With the

accession of the hot season in June the disease (as would appear to be customary with plague in Mesopotamia, when it is prevalent there) rapidly declined and apparently died out, to re-appear at the beginning of winter.

1874-75. In December 1874 plague again broke out in Diwanieh, and the disease subsequently showed itself in several localities on the Euphrates south of that town. As the year 1875 advanced, the malady spread throughout the district occupied by the Montefik Arabs, which lies immediately south of that occupied by the Affij Arabs, the chief seat of the outbreak the previous year, and extended as low down on the Euphrates as Suk-e-Sheyukh. This year (1875) plague spread over the whole tract of country lying between the Shat-el-Hai eastwards and the Euphrates from Samava to Nassreah, the Shat-el-Akshan, and the Sea of Nedjef westwards, attacking Kut-el-Amarah at the junction of the Shat-el-Hai with the Tigris, Shinafieh at the outlet of the sea of Nedjef, and Nassreah at the junction of the lower communication of the Shat-el-Hai with the Euphrates. Moreover, spreading lower along the river than Nassreah, the disease, as already mentioned, appeared in Suk-e-Sheyukh. On the setting in of the hot season of 1875, as in 1874, plague again declined and seemingly ceased. No official returns of the loss of life in this year's prevalence have yet been published. Surgeon-Major Colvill, attached to the British Residency, Bagdad, who visited the infected district while the epidemic was in progress, estimates the probable mortality from plague for the two years 1874 and 1875 at 4,000.* He apparently considers the official returns of the mortality in 1874, upon which Dr. Castaldi based his estimate of the mortality for the three months of greatest prevalence of plague that year, as much exaggerated. If Mr. Colvill's estimate be the more trustworthy, the development which the epidemic underwent in 1876 assumes a more serious aspect from the large proportions which must be assigned to it. The cessation of plague in Mesopotamia, during the hot season of 1875, was announced by a telegram from Bagdad, dated the 11th July.

1875-76. I now enter upon the history of the further development of plague in Mesopotamia in 1876.

In the middle of November 1875 plague again broke out on the Lower Euphrates. It first showed itself within the district on the left bank of the river, in the two permanent marsh villages of Obara and Abu Jassein, appearing in each village about the same time. Obara lies 10 miles, or thereabout, to the north-north-east of Hillah, and of its inhabitants, forming eight families, all were killed by the disease except one, an old woman. Abu Jassein, a village within the district occupied by the Abu Sultan tribe of Arabs, lies south of Hillah, and is situated on a small irrigation canal which opens from the Euphrates between the Abu Chumash † and the Dagarra canals. Here among a population estimated at 400, plague was fatal to 80 persons in the short period of from six to seven days.‡

Near upon the same time that plague broke out on the Euphrates, it appeared also on the Tigris, at Azizie, a temporary village of reed huts, situated on the right bank of the river, between Kut-el-Amarah and Amarah.§ Information as to this outbreak, the first relating to the probable re-appearance of plague in 1875–76, was communicated by the Sanitary Administration of Bagdad to the General Board of Health of Constantinople, in a telegram dated the 6th December 1875. In this telegram the

* See Mr. Colvill's Report on Plague in Mesopotamia in 1874–75, printed with my previous Memorandum (p. 18 of these papers).

† The Abu Chumash canal appears to be the first in order of the larger irrigation canals opening from the left bank of the Euphrates, above the Dagarra canal.

‡ These facts were ascertained by Surgeon-Major Colvill during a personal inspection of the district, made in the last week of February 1876.

§ Amarah is situated about midway between Kut-el-Amarah and Kurna, on the left bank of the Tigris. In the despatch conveying the news of this outbreak to England, as quoted in my first Memorandum, Azizie was described as situated "near It Hané," on the Euphrates. The information as to the position and character of the village given in the text, also as to the position of Amarah, was derived from Mr. Colvill during his recent visit to England. Dr. Castaldi, the Ottoman Sanitary Delegate in Teheran, in a communication to Her Majesty's representative at the Shah's court, gives the following account of the outbreak at Azizie, upon the authority of a journal published at Bagdad, in the Turkish language, and having the title of *Le Zebre:*

"Towards the epoch of the feast of Kourban Bairam, in the Kaimacanate of Azizie, nine individuals, camped "under tents and belonging to a nomad tribe, having eaten of the flesh of a diseased camel, became suddenly "ill. They were attacked with ardent fever, and had buboes in the groins, the armpits, and behind the ears. "Of these nine individuals eight died, one alone recovering. According to the same journal two medical men "were sent to the spot, and caused it to be isolated by a sanitary cordon. No extension of the malady else-"where, it is stated, followed. But it would appear from a letter, dated the 3rd February (1876), which I "have received from M. Paduan, the Sanitary Inspector for Bagdad, that a few days after the adoption of the "measures authorised by the Kaimacan of Azizie, another case occurred under the tents of the same tribe. "M. Paduan adds that he entertains serious fears that this malady, which he has no doubt is plague, will "compromise Bagdad, by reason of the contiguity of the infected locality (15 hours distant from the city) and "the insubordination of the tribe among which the disease has broken out."

disease was designated as "a bubonic malady;" and although its actual nature was no doubt suspected both in Bagdad and Constantinople, no measures appear to have been taken to ascertain whether it was an isolated phenomenon or not. It was not, indeed (as would seem from the information furnished to this Department), until late in February that further information was communicated from Bagdad to Constantinople on the subject of plague. On the 20th of that month a telegram from the former city announced that from six to eight deaths from plague were occurring daily in Hillah. At this date plague had been present in Hillah certainly since the 1st January, on which day a death from the disease was officially recorded, and it had existed in the surrounding district since the middle of the previous November. It was probably present also in February at Kut-el-Amarah on the Tigris, although its existence there at this time was not ascertained until the beginning of May by Mr. Colvill. It was, moreover, most probably distributed at the same period, as subsequent events showed, over the greater portion of the area afterwards occupied by the malady this year (1876) in Mesopotamia, not even excepting Bagdad itself, where its presence appears to have been first made known officially on the 1st March. 1876.

Except in a few instances, chiefly relating to the larger centres of population, chronological data as to the extension of the disease in Mesopotamia in 1876 are not forthcoming; but the area within which it prevailed and the district chiefly affected by it would seem to have been ascertained with resonable probability. The malady would appear to have shown itself with more or less activity in various parts of the tract of country lying between the Shat-el-Atchin and the Shat-el-Hai, and along that part of the course of the Euphrates where it had been chiefly active the previous year (1875). Thus its presence was noted again at Shinafieh, on the Sea of Nedjef, at Jerboyah, Diwanieh, Samara, and other places on the Euphrates as low down as Suk-e-Sheyukh, and along the course of the Shat-el-Hai to its junction with the Tigris at Kut-el-Amarah. Moreover, in the district lying to the north of the tract of country above described, and which had been the scene of the outbreak of 1873–74, plague was noted at Meshed Ali, at Kufa, Kifl, Tanabi (Tuarich) on the borders of the Hindieh marshes (the last-named place being the chief town of the Hindieh district), and at Kerbella. The disease also appeared at Hillah and at Bagdad, and in the villages of the district lying between the two towns.

The stress of the outbreak of 1875–76 would appear to have fallen upon the tract of country which extends immediately to the north of the district that had suffered in 1873–74. This tract includes the two chief Mesopotamian towns (Bagdad and Hillah), and came now with them for the first time, since the reappearance of the disease on the Lower Euphrates in 1873, fully within the area of its active prevalence.

During the first week of 1876, 14 deaths from plague were recorded in Hillah, the earliest of these on the first day of January. From this period until the cessation of the disease in June plague was probably never absent from the town. The official records (which in this instance and in all other instances where reference will have to be made to them in this Memorandum, include only the cases and deaths declared to or discovered by the local authorities, and probably comprise little more than half the actual number) show an aggregate mortality from plague of 1,007 from the 1st January to the 22nd June, inclusive. Below is a summary of these records so far as they have been furnished to the Department.* They indicate that the disease Hillah, 1876.

* Summary of Official Statements made to the Foreign Office respecting the progress, in 1876, of Plague at Hillah (estimated population, 15,000).

1876.	Cases.	Deaths.
Jan. 1–7	—	14
„ 8–14	—	6
„ 15–20	—	14
„ 21–27	—	17
„ 28–Feb. 4	—	7
Feb. 5–11	—	0
„ 12–18	—	0
„ 19–21	—	3
„ 22–Mar. 12	108	43
„ 13–19	45	25
„ 20–26	76	34
„ 27–Apr. 1	66	42
Apr. 2–7	112	56
„ 8–14	166	86
„ 15–21	230	159
„ 22–28	245	148
Apr. 29–May 5	84	48
May 6–12	152	121
„ 13–19	68	111
„ 20–26	46	36
„ 27–31	16	11
June 1–3	0	0
„ 4–10	17	10
„ 11–17	9	—
„ 18–24	7	3
„ 25–July 2	2	2
July 6–13	5	3
„ 17–22	4	4
„ 28	1	0
„ 30	1	0
Total deaths		1,007

gradually increased in activity from the close of February until April, during which month it appears to have been most widely prevalent in the town; that it declined at first slowly, and afterwards more rapidly, in May; and that, finally, it ceased in July. The malady first showed itself and became prevalent in the portion of Hillah which lies on the left bank of the Euphrates (on which bank, in the district adjacent to the town, the disease had broken out in November 1875); and it was not until the beginning of the third week of March that its existence in the portion of the town on the right bank of the river was officially notified. But at the beginning of March, as was ascertained by Mr. Colvill, plague had appeared in several of the villages of the district on the right bank adjoining Hillah, and deaths from the disease had occurred on the routes from that town to Kerbela and Nedjef, among persons engaged in carrying to those places corpses for burial, the population of Hillah consisting mainly of Shiah Mahommedans.

The village of Kifl, lying on the eastern margin of the Hindieh marshes, and the place where persons journeying to Nedjef take boat to navigate the marshes, was attacked with plague at the beginning of March, or at the close of February. Writing on the 6th April, Mr. Colvill reported that, "during a few days before the 7th March," 15 persons had been attacked and 14 had died from the disease in this place.

Plague was first noted in both Kerbela and Nedjef in the course of March. If such official records of the disease in these towns as have come to hand could be trusted, scattered cases only would appear to have occurred in the first-named town, while in the last-named town it spread to a certain extent. Seven deaths from plague were reported from Kerbela during the three months of March, April, and May; and 98 deaths from Nedjef from the 25th March to the 28th May, inclusive. Dr. C. Millingen, however, one of the delegates of the Ottoman General Board of Health to the Medical Commission in Bagdad, estimates the mortality from plague in Kerbella in 1876 at about 100, and in Nedjef at 250.

Kut-el-Amarah, on the Tigris, below Bagdad, was attacked by plague most probably early in February. Out of a population of about 1,500, there were in this village, according to Mr. Colvill, 330 to 340 attacks, of which not less than 300 were fatal.

Bagdad, 1876.

In the course of the second week of March the presence of plague in Bagdad was officially recognised. Five cases and two deaths from the disease were recorded as having occurred in the portion of the city lying on the right bank of the Tigris on and before the 13th March. The disease quickly increased, and became most prevalent during the later weeks of April and the earlier weeks of May. It declined rapidly in June, and ceased in July. From the 13th March to the 5th July, inclusive, 4,570 cases and 2,616 deaths were reported to the local authority.*

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* Summary of Official Statements made to the Foreign Office respecting the Progress, in 1876, of Plague in Bagdad (estimated population, 60,000).

1876.	Plague. Cases.	Plague. Deaths.	Deaths from other Causes.
To 13th March - -	5	2	—
March 16–20 - - -	29	15	—
„ 21–27 - - -	119	45	43
„ 28–April 1 - -	145	75	38
April 2–8* - - -	256	169	31
„ 9–15 † - -	455	267	53
„ 16–23 - - -	535	336	46
„ 23–29 - - -	609	399	32
„ 30–May 6 - -	643	409	28
May 7–13 - - -	480	341	31
„ 14–20 - - -	457	234	25
„ 21–27 - - -	304	162	35
„ 28–June 3 - -	311	76	31
June 4–10 - - -	132	69	28
„ 11–17 ‡ - -	79	12	—
„ 18–24 § - -	7	3	—
„ 25–July 2 - -	4	2	30
	4,570	2,616	

* Plague appeared in the barracks and prisons.
† Twenty cases of plague, and 8 deaths among garrison, and 7 deaths among prisoners.
‡ Ague and pernicious fevers began to increase in frequency.
§ Noon temperature ranged from 33° to 42° Cent. (91·4° to 107° Fahr.) this week.

On the 11th April the river Tigris rose to an unaccustomed height, and the next day it burst its banks in several places above the city, inundating the environs.

In April plague broke out in Khuzistan, South-western Persia, apparently having extended there from the infected district in Mesopotamia. Of this outbreak an account will be given in a later section of this Memorandum. It is here mentioned in its chronological sequence.

The next month (May), near the beginning, information appears to have been first received, by the Sanitary Administration in Bagdad, of the presence of plague at several points on the Euphrates below Hillah, including Diwanieh, Samava, and Suk-e-Sheyukh, at Shinafieh on the Sea of Nedjef, and along the course of the Shat-el-Hai.

Above Hillah on the Euphrates, at a date unknown, Musseib, the place where caravans coming from eastwards, and travelling to Kerbela, cross the river, was attacked.

Dr. C. Milingen has given the following estimate of the mortality probably occasioned by plague in the outbreak of 1875–76 :—

	Approximate Number of Deaths from Plague.
Hillah and its neighbourhood - - -	6,000
Kufa - - - - - -	70
Kifl - - - - - -	250
Musseib - - - - - -	80
Kerbela - - - - - -	100
Nedjef - - - - - -	250
Hirdijih (? Hindieh) villages - - -	2,500
[Bagdad - - - - - -	2,616]
Minimum mortality from plague throughout the province including the nomadic tribes - -	20,000

On the 22nd June, after unconfirmed rumours of the existence of plague at Kerkook and Mosul, the General Board of Health, Constantinople, received by telegram from its sanitary agent in Teheran a notification of the reported prevalence of the disease at Sakkys, in Persian Kurdistan. The district of Sakkys had been in part affected by the circumscribed outbreak of plague which had occurred in Persian Kurdistan in 1871, but the town of the name, the seat of the outbreak to which the telegram referred, had then escaped. The Ottoman General Board of Health, on the receipt of Dr. Castaldi's telegram, immediately telegraphed instructions to two of their agents, Dr. Wortabet and Dr. Sebastio, then at Mosul on their way to Bagdad, to proceed to Sakkys and report upon the state of things as to epidemic disease there. These gentlemen visited Sakkys, and failed to discover any trace of plague, but ascertained that small-pox had been epidemic in the district.

Persia, 1876.

The outbreak of plague in Khuzistan, South-western Persia, already referred to, was investigated by Dr. C. Millingen. The following account of the results of this inquiry

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The Table on the previous page is compiled from the official returns furnished to the Department during the progress of the outbreak. On the 23rd June, the British Resident in Bagdad, Col. Nixon, communicated by telegraph the following summary return of deaths from plague during the outbreak :—

BAGDAD, 1876.

	Deaths from Plague.
February and March - - - -	259
April - - - - - -	1,707
May - - - - - -	1,550
June - - - - - -	123
	3,639

This is no doubt the more accurate return.

The first cases seen by Mr. Colvill in Bagdad were discovered by him in the portion of the city on the left bank of the river, during a search made on the 30th March, in consequence of a rumour having reached him that plague was suspected to exist there. He found 12 cases of the disease in the quarter of the city known as "Bab-il-Shaek," from its surrounding the great tomb of "Shaek Abdul Kadr," and ascertained that six deaths had occurred from it there, three of them during the previous night. Mr. Colvill states that it was in this spot that plague first showed itself in the outbreak of 1831.

is taken from a letter addressed by Dr. Millingen to Mr. Colvill, with a copy of which the last-named gentleman has favoured me:—

"The disease at Shuster* was certainly plague. The said disease first appeared in a "village 10 miles to the north of Shuster, called Jellikan, towards the latter part of "March. It broke out there just after the arrival of a caravan of pilgrims from "Kerbela, who had come by way of Hillah, Bagdad, Amarah, and thence by land to "said village. Two persons belonging to said caravan died of plague; the corpses "were washed and buried at Jellikan. Shortly afterwards cases occurred in the "village in such numbers as to constitute an epidemic. Out of a population of 300 "souls there were 85 deaths. At Shuster the disease appeared in April. The first cases "were noticed among persons who had come to the town from Jellikan. The "disease lasted to the end of July. Out of a population of 8,000 there were about "1,800 deaths. As many as 40 deaths a day occurred during the height of the "epidemic. In the neighbouring villages there were a few isolated cases. At "Shahwelli, 20 miles to the west of Shuster, however, a rather severe epidemic "appeared about the end of April. Out of a population numbering 400 souls there "were 70 deaths. At Dizful some 20 deaths in all occurred during the month of "May, chiefly among persons from Shuster. At Ahwas, Hawiza, Mohamrah, and "among the Beni Lam and Ichaab Arabs, there was nothing in the shape of "plague.

"The mortality in the Shuster-Dizful district did not exceed 2,500.

"The plague did not originate in said province of Persia, but was introduced from "Turkish Arabia by infected pilgrims."

1876-77. To the foregoing account of the progress of plague in 1875–76, I add a brief summary of the information which has been received of the progress of the disease in 1876–77, to the time of the present writing (June).

Mesopotamia, 1876-77. At the beginning of July, 1876, all known active manifestation of plague in Mesopotamia had ceased, and the disease appears to have remained dormant until about the middle of October. It then broke out on the left bank of the Euphrates at a point higher than the disease had previously been observed along the course of the river, namely, in the district of Abu Graib, 50 miles or thereabout above Musseib, the highest point mentioned in the various reports to which plague had extended in the earlier months of the year.†

1877. On the 15th January of the present year (1877), 10 deaths from reputed plague occurred among an Arab tribe living in the district of Azizie, which, as previously described, is situated below Kut-el-Amarah, south of Bagdad, on the right bank of the Tigris.

On the 17th of the same month (January) two cases of suspected plague happened in Bagdad, one of them fatal, on the 24th; and on the 26th another suspicious case, also fatal, was observed.‡ Doubtful cases occurred from time to time in the city during the months of February and in the beginning of March, but after the middle of the last-named month there was no longer question that plague was prevalent in the city, and steadily extending. The total mortality from plague officially recorded from

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* Shuster was the capital of the province of Khuzistan until it was nearly depopulated by plague in 1832. After this catastrophe, Dizful, 30 miles distant, took precedence as chief town of the province.

† On the 23rd September, during the Servian war, a telegram was published in the *Times*, dated from Belgrade the day before, and stating that "the plague had broken out in the army of Abdul Kerim Pasha, in "consequence of which the Turkish commander was compelled to change his positions before Alexinatz every "three days, and to burn the tents and huts occupied by his troops." This statement was not confirmed, and except, as subsequently rumoured, that typhus had appeared among the Turkish forces, it is not easy to understand its origin.

It is noteworthy of the outbreak in the district of Abu Graib, recorded in the text, as of the outbreak at Azizie in November of the previous year (1875), one of several outbreaks marking the beginning of the diffusion of 1875–76, that it was attributed locally to the consumption of the flesh of diseased camels. Drs. Wortabet, Lubitz, and Sebastio, of the Sanitary Administration of Bagdad, visited Abu Graib in the third week of November, immediately after the news of the outbreak reached Bagdad. They saw there two persons who were suffering from fever and glandular swellings, and who had been ill about a fortnight. The inhabitants of the district stated that a month before a party of Anezi Arabs had encamped in it for the sake of pasturage. The camels of the party became ill and were slaughtered, the flesh, notwithstanding the circumstances under which the animals were killed, being used for food. Of those who ate it, 40 sickened and died. The inhabitants then, alarmed by this fatal outbreak of disease, rose upon the nomads, and compelled them to withdraw into the desert.

‡ [See on this subject Memorandum No. III., the first footnote on p. 37 of these papers.]

the 26th January to the 16th June was 1,672, a number less by 939 than during the corresponding period of 1876.*

On the 15th March several fatal cases of suspected plague were reported to have occurred at Samara, situated 70 miles above Bagdad, on the left bank of the Tigris.

The disease, also, according to Mr. Colvill, was probably present the same month in Hillah, and the subsequent month in Shatra, on the Shat-el-Hai, in Amara, and in Azizie.

Finally, to complete this summary of the progress of plague from its reappearance on the Euphrates in October last to the latest news received, information of the suspected existence of plague in Resht, near to the south-west coast of the Caspian, was telegraphed from Constantinople on the 24th April 1877, and the actual presence of the disease there was made known by a telegram from Teheran, dated the 28th April. A later telegram from Teheran, addressed to the General Board of Health, Constantinople, by Dr. Castaldi, the Ottoman sanitary agent there, and dated 20th May, states that a medical commissioner (Mirza Mehmet Hassan Khan) sent by the Persian Government to Resht, had seen in that town 14 cases of plague, of which 13 ended fatally.†

Measures of prevention adopted.

I proceed now to supplement this account of the prevalence of plague in 1875–76 with a description of the various measures which were adopted by the Ottoman and other Governments for the purpose of limiting the diffusion of the malady. In detailing these measures reference will be made almost solely to those used in 1876. Substantially the same measures were put in force in 1874 and 1875.

(*a.*) In Mesopotamia.

At the close of the prevalence of plague in Mesopotamia in 1875 (July), the General Board of Health, Constantinople, proposed to name a permanent Medical Commission for the examination of the districts which had been infected by the disease, and for taking precautionary measures in anticipation of its reappearance. This Commission does not appear to have been formed; and, as already related, notwithstanding the reported occurrence of several cases of "a bubonic malady," at the end of November or beginning of December 1875, in the district of Azizie on the Tigris, no measures seem to have been taken by the sanitary officials in Mesopotamia to ascertain the actual nature of the malady, or, assuming it to have been plague, the extent of its prevalence in the districts bordering the Lower Euphrates. It was not until 20th February that the reappearance of plague was reported to the Board of Health, Constantinople, by telegram from Bagdad; the report also stating that sanitary cordons had been established at Tekrid and Kefri, covering the routes northwards along the Tigris towards Mosul, and north-eastwards into Kurdistan; and that the authorities at Basra had been warned of the danger.

Now at this time, as was ascertained by Mr. Colvill, plague had been active in the district adjoining Hillah, and probably higher up the Euphrates, for a period of three months, and had been continuously present in the town of Hillah since the 1st January. The disease was also most probably present in Kut-el-Amarah, on the Tigris, about the 20th February, and it is little likely to have been absent from

* Table showing the Number of Deaths from Plague officially recorded in Bagdad in 1877 up to June 17th, compared with those recorded for the corresponding period of 1876.

1877.	Deaths from Plague.	1876.	Deaths from Plague.
26th Jan. to 31st March - -	46	To 1st April - - -	137
Week ending 7th April - -	90	Week ending 8th April - -	169
„ 14th „ - -	177	„ 15th „ - -	267
„ 21st „ - -	250	„ 22nd „ - -	336
„ 28th „ - -	273	„ 29th „ - -	399
„ 5th May - -	288	„ 6th May - -	409
„ 13th „ - -	222	„ 13th „ - -	341
„ 19th „ - -	147	„ 20th „ - -	234
„ 26th „ - -	104	„ 27th „ - -	162
„ 2nd June - -	24	„ 3rd June - -	76
„ 9th „ - -	4	„ 10th „ - -	69
„ 16th „ - -	6	„ 17th „ - -	12
	1,672		2,611

† Mr. Consul Churchill, writing from Resht on the 25th April, states that he had caused particular inquiries to be made as to the nature of the disease which had given rise to so much apprehension in that town, from which it had resulted that the malady was not plague. Writing again on the 9th May, he describes the disease as of "a very peculiar nature," and although still questioning its being plague, he states "that it is difficult to "say what the malady really is."

Bagdad itself at this time, although not recognised in that city until the second week of March. The disease escaped attention during the period of recommencing activity, when very probably it is most apt to be disseminated, and when most certainly measures can alone be taken with any reasonable chance of arresting its further progress. This want of early knowledge of the beginning of the year's outbreak depended much upon the circumstances under which the outbreak occurred, namely, among communities and tribes which have little and but incidental communication with the greater centres of population, where sanitary officials are stationed; but it also depended upon concealment of the facts by the people. "The aversion of the "people," writes Mr. Colvill (1st March 1876), "not only to discuss, but even to "mention or acknowledge the presence of the disease, is extraordinary; and, to say "the least of it, the reticence of all the Government officials prevents not only a "general knowledge of the development of the disease, but plainly shows how on "former occasions nothing at all was heard of plague till it burst forth carrying off "its thousands and tens of thousands." It would seem, however, from observations in subsequent despatches of Mr. Colvill, that the aversion to disclose the existence of plague among the infected communities is one of the necessary and most unfortunate results of the vexatious restrictions to which they are apt to be subjected with the view of arresting the spread of the disease.

A despatch from Pera, dated the 8th March, announced the formation of a Commission at Bagdad, consisting of Dr. Paduan, Mustapha Effendi, Dr. Adler, and Dr. Mehemed Ali, to whom were joined Dr. Charles Millengen, of Constantinople, and Dr. Arnaud, then the Ottoman sanitary agent at Jeddah, who had been directed by the General Board of Health to proceed to Bagdad with all despatch. Subsequently Mr. Colvill was added to the Commission as an honorary member. This Commission was appointed to organise the necessary precautionary measures against plague. Soon after (Despatch, Constantinople, 15th March), the Board of Health, dissatisfied with the lax manner in which the measures recommended by the sanitary officials in Mesopotamia were being carried out, sent stringent instructions to the authorities there—

(*a.*) To empty, wash, and disinfect every house attacked by plague, removing the inhabitants into isolated quarters away from the rest of the population:

(*b.*) To burn infected huts wherever practicable:

(*c.*) To establish cordons at—

(1.) Kifl, for preventing the conveyance of dead bodies from Hillah to Nedjef:

(2.) Kefri, for stopping travellers by that route to Kurdistan, and subjecting them to quarantine:

(3.) Tekrid, on the Tigris, for the same object, as to travellers going to Mosul:

(4.) Biredjek, Deir, Abu Kemal, Abu Maria, and Tadmor on the Euphrates and desert routes to Syria, for a like purpose.*

(*b.*) In Ottoman and Egyptian ports.

In addition to these local measures, a quarantine of 15 days was declared in Ottoman ports against all arrivals from Basra and Fao (which ports now issued foul bills); and the Board of Health for Egypt at the same time directed a quarantine of like duration to be instituted against arrivals in the ports of that country from all the ports in the Persian Gulf and from Makallah.

(*c.*) In Bagdad.

About the middle of March (Despatch, 22nd March, Constantinople) two other medical men (Dr. Donea and Dr. Cabiades) were sent from Constantinople to Bagdad to assist in carrying out sanitary measures there, and before the close of the month (Despatch, 29th March, 1876, Constantinople) it was reported that 15 capacious reed huts had been erected outside Bagdad, each for the reception of 10 plague patients, and that others would be erected as needed; that stone dwellings were being whitewashed; personal effects exposed to infection, which it was not held desirable to destroy by fire, washed; drains and latrines disinfected by sulphate of iron and charcoal; the public baths closed; military parades stopped, and the reserve troops dismissed and sent home. Further, that quarantine against arrivals from Bagdad had been established at Kurna, at the confluence of the Tigris and Euphrates.†

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* The authorities of Damascus, on the news reaching that city of the appearance of plague in Mesopotamia, established a cordon at Domner, the last station in the desert before reaching Damascus, for travellers coming from the infected district.

† In a report addressed to the Surgeon-General of the Indian Medical Department, Bombay, under date 30th March 1876, Mr. Colvill writes: "A temporary hospital of matting was erected on the outskirts of "Bagdad, on the right bank, for those travellers who may be attacked and have no home; but the day before "yesterday a Turkish official, with strange indiscretion, ordered a householder into the hospital. The result "has been a general exodus, and yesterday about half the population on that bank of the river, all Arabs, left "for the desert."

With reference to the isolation of cases, Dr. E. D. Dickson reports (29th March 1876): "All patients found amongst the indigent classes, or in small ill-ventilated "houses, are transferred to the huts, and there treated by the municipal doctor under "the supervision of the Medical Commission. The service is performed by a superin- "tendent, an apothecary, a cook, and several attendants. Two surgeons and a female "assistant are especially charged with the surgical treatment of plague sores and "swellings, medicines are supplied gratuitously to all, and the municipality and "police agents lend their services on every occasion. The reed huts that have been "occupied by those affected by the plague, and the clothing of infected persons, are "destroyed by fire."

On the 12th April the General Board of Health, Constantinople, telegraphed renewed instructions to Bagdad for the isolation and disinfection of infected localities, and the strengthening of sanitary cordons; and added a further instruction that the exportation of rags of all sorts from Mesopotamia should be prohibited.

Mr. Colvill states (18th April 1876) that these later instructions required the Governor-General "to cut off communication between all towns and villages, and "also between the portions of Bagdad on the right and left bank of the Tigris, except "for officials and persons of high degree." The same instructions, he also states, directed the Inspector of the Sanitary Department "to fumigate and blockade all "houses in which plague may appear by placing sentries at the door." Orders were, moreover, given by the Grand Vizier for the evacuation of the prisons, and the removal of the troops in garrison from the barracks; also for encamping the prisoners outside the city in tents, the prisons and the barracks to be then cleansed and disinfected. The General Board of Health further directed a medical officer (Dr. Malezian) to proceed to Diarbekir, and keep watch for any indications of plague there or at Mosul. Instructions were, in addition, given that the exportation of wool from the infected district should not be interfered with, and no processes for its disinfection (from their futility) enforced, but that each cargo should be accompanied with a certificate as to its source.

These several instructions, it will be observed, were issued after the activity of plague had become fully declared, before any certain knowledge existed of the extent of its dissemination, and so far as they affected the healthy, tended to frustrate those instructions which related to the sick. For the restraints which the instructions imposed upon the healthy supplied numerous motives for concealing sickness and so rendering inoperative the measures which would alone tend certainly to arrest the progress of the disease, namely, the early removal of the sick of the poorer classes, where practicable, from their dwellings, and their isolation in abundantly ventilated huts, or other buildings set apart for the purpose; or (this measure failing), the securing to the sick, as far as practicable, facilities of ventilation and freedom from crowding in their own dwellings.

Observations of H.M. Consul-General, Bagdad, and of Surgeon-Major Colvill, on the measures adopted in Mesopotamia.

The observations of the Consul-General at Bagdad, Colonel Nixon, and of Mr. Colvill, on the operation of the different measures of quarantine referred to, as contained in their despatches from time to time, furnish a most instructive commentary on the directions of the Ottoman General Board of Health, and I quote them in order of date:—

February 22, 1876.—Colonel Nixon observes:—"I am not in a position to state "that there is any necessity for the measure (viz., the establishment of sanitary "cordons at Tekrid and Kifri), but it is apparent that any cordon established by the "Quarantine Department will be quite useless as a precaution against contagion, as "the people will evade it as they did last year, and it will have the effect of damaging "trade without stopping the spread of the disease."

March 1, 1876.—Mr. Colvill observes:—"I have on previous occasions reported, "and the same holds good now, that not only is quarantine as conducted in this "province useless, but by collecting together numerous masses without any sanitary "care, it tends to spread the disease it is established to check."

March 16, 1876.—Mr. Colvill:—"I called (the Governor-General's) particular "attention to the necessity of avoiding the establishment of quarantine, because "quarantine, as I know it, in this province is simply a collection of unwashed masses, "without any sanitary care; and the result of establishing quarantine at different "points round Bagdad will only be cutting off the work of the labourer and raising the "price of provisions, while nothing could be devised better than this for the develop- "ment of plague."

April 18, 1876.—Mr. Colvill, with reference to the before-quoted instructions of the General Board of Health of Constantinople:—"The result of this order, as soon as it

" is known, will of course be to diminish the returns (of cases) very considerably, for " no family will desire to have its house blockaded, and should there be sickness or " even death, it will certainly be concealed from observation. It is unnecessary to " remark on the worthlessness, however grand it may appear on paper, of the order " cutting off communication between towns and villages, while in a corrupt country " like this the execution of that order is left in the hands of a soldiery who are in " arrears of pay for the last fourteen months, having, at the same time, the outlet that " 'officials and persons of high degree' are to pass. I have over and over again " remarked not only on the utter worthlessness of quarantine, but also on the harm " it actually does. Any quarantine the Turks attempt here will only fan the flame " and tend to develop the plague, which undoubtedly will spread over all Asiatic " Turkey."

April 18, 1876.—Mr. Colvill observes:—" Bloodshed being threatened, the magis- " trates of the district in which the infected houses were closed resigned, and the " Governor-General has expressed his inability to carry out the blockade measure. I " heartily agree with him, for not only would there probably be a rising of the people, " but from the formation of the houses the inhabitants can pass from roof to roof as " easily as cats."

April 26, 1876.—Mr. Colvill:—" The Shiah Mahommedans not being able to carry " their dead to their shrines (Nedjef, Kerbela, Imam Moosa) are burying inside their " houses, and never report the cases. This will be a danger when the restrictions are " removed, and these bodies are exhumed. . . . . I mentioned also that " communication was cut off between the two portions of the city divided by the " Tigris, unless for officials and persons of high degree; but every evening 20 or 30 " round boats, called kubas, carrying about a dozen people, cross the river under my " window after dark. Much to my disgust fumigation was attempted in the houses, " not with the intention of doing any good, for in no one instance was it done in the " least degree effectually, but confessedly simply to satisfy the demands of the " Sanitary Commission at Constantinople. The result, of course, was to produce " irritation and cause resistance, and to prevent the returns being anything like " complete. . . . . I cannot help thinking that there is now quite as much " danger from a rising in the city as from the plague itself, for the lower orders are " irritable and discontented, while the wealthier have either left or are on the point of " leaving."

May 10, 1876.—Mr. Colvill:—" The newspapers from Constantinople informed me " that a severe quarantine has been established at Kurna, and since my last letter I " visited that place. The quarantine station is on the left bank of the Tigris, above " and within sight of the village of Kurna. I found there 53 boats of from 20 to 40 " tons, chiefly laden with Turkish Government grain, and four steamers, extending " along the bank of the river for a little more than a mile and a half. Immediately " on the margin of the river was a narrow swamp with decayed vegetation, and beyond " that rice fields. I inquired about travellers and wool, but I found that there were " only about a dozen travellers and no wool whatever, while I know that wool is and " has been flowing into Busreh (Basra) abundantly. The explanation given as to the " paucity of travellers was, that on the Tigris they all landed at Amarah, and passed " by Habreiza either to Busreh or Mohammera (Mohamrah); while on the Euphrates " they simply diverged through the marshes before entering Kurna, and found their " way into Busreh by many roads.

" There is no attempt made to separate the boats, and the crews intermingle freely " together. It may be judged from this that the severe quarantine at Kurna is a " simple absurdity, but I notice the name quarantine prevents travellers who have " not urgent business from leaving Bagdad.

" . . . . . In previous letters I reported the risk of disturbances here " from the irritation caused by the various measures adopted. Since I last wrote " there has been a rising in that portion of Bagdad on the right bank. The people " began first by protesting against being confined by the 'Cordon Sanitaire,' and being " cut off from the left bank, where their work chiefly lies; but the exciting cause " was the Sunis being permitted to bury in the fashionable burying ground of Sheik " Maroof, while the Shiahs were prevented from using their graveyards at Kaizmani " (Imam Moosa), Kerbela, and Nedjef. The Shiahs attacked the Sunis, and a fight " occurred which required a regiment of Turkish infantry to subdue it. About 15 " people, I believe, were severely wounded. You will remark that I have all along " protested against attempting ineffectual measures which simply produce irritation " and no good. Now, however, the Local Government and the Sanitary Commission

" will reap the fruit of their labours, for the people are fast beginning to feel their " power, and the immediate result of this disturbance has been to replace the bridge " across the river, to open the roads, and allow free communication, the only restric- " tions being the quarantines established on the border of the Province."*

These observations of Mr. Colvill and the observations of Colonel Nixon, also quoted, upon the quality of the measures of quarantine against plague established by the Ottoman Government, prove that these measures afforded no security against the extension of the disease, while they directly aggravated the conditions which foster its prevalence. It must be mentioned, however, that the Ottoman General Board of Health, at the date of Mr. Colvill's despatch, from which the extracts last quoted are taken, still reposed faith in the efficaciousness of the measures, the operation of which he describes.

In answer to questions put during a meeting of the Board early in May by the Austro-Hungarian Delegate, on behalf of his Government, Dr. Bartoletti, as Chairman, replied (according to a despatch from Dr. Dickson, of Constantinople, dated 10th of May 1876), as follows:—

" Plague had not extended beyond Mesopotamia; the cordons at Tekrid, on the " Tigris route, and Salahié, on the Euphrates route, had been strengthened, and " appeared to bar effectually its transmission into Kurdistan and Syria. There was " no apprehension of its being conveyed by sea owing to the restrictive measures " enforced at Kurna, and the quarantine applied to arrivals from every part of the " Persian Gulf."

It is now known (though of course not then known to Dr. Bartoletti) that when he expressed this opinion, plague, carried, as it is believed, along a route free from any interruption at the frontier by quarantine restrictions, had passed the Mesopotamian border into Khuzistan, South-Western Persia, and that a serious outbreak in Shuster was at the time declining.†

With reference to Colonel Nixon's and Mr. Colvill's observations on the effects of the quarantine measures adopted by the Ottoman authorities in damaging trade, interrupting the work of the labourer, and raising the price of provisions, it may be well to remark that to the present time plague in Mesopotamia has chiefly affected the poorer classes, among whom it would seem as if the margin between a sufficiency of food and scanty food were a very narrow one. An exceptional inundation, or a passing interruption of the trade of the district, appears at once to reduce a large proportion of these poorer people to a state of semi-starvation. It is true that during the years 1873 and 1874 there appears to have been abundance of grain and dates, the staple food of the poorer classes; but at the best the poor seem to subsist on an impoverished diet, and to live under conditions of domestic filth and personal squalor, which are aggravated in the marsh villages, among which plague first originated, to a pitch wholly indescribable. The recent outbreaks of plague in 1874 in Bengazi (Tripoli), and in the Assyr district (Western Arabia), concurred with famine; in Persian Kurdistan (1871) with a state of extreme impoverishment which augmented the evils arising from the unutterable filth among which the communities first attacked with the disease lived.

None of the Foreign Office despatches which have been communicated to this Department relative to the progress of plague in Mesopotamia contain any information as to the extent to which isolation of plague cases had been carried out in Bagdad and elsewhere, and the huts erected for the purpose brought into use.

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* Mr. Colvill, in a report to Colonel Nixon, dated 3rd August 1876, gives the following illustration, from personal experience, of river quarantine at Bagdad, in respect to plague, in 1874:—

" One would have thought that if any internal quarantine could be strictly kept, it would be with passengers " on board a river steamer. Such, however, was not the case, for when I arrived (at Bagdad) in quarantine " in one river steamer, another was there before me, and many of the passengers were enjoying themselves in " Bagdad. On board of my steamer were many Jewesses returning from a pilgrimage to the tomb of Ezra. " A doleful few told me that while during the first evening one or two poor Jewesses came out from Bagdad " to be exchanged for their wealthier co-religionists on board, and required 5*s.* for their trouble; now they " wanted 1*l.*, or, to be more correct, a Turkish *lira*. All Jewesses, rich and poor, are wrapped up in sheets " dyed with indigo, and it is impossible to recognise them. I saw a servant of mine bearing on his shoulders " a mountain of dirty clothes, in broad daylight, which I had been wearing while searching for plague on the " Euphrates. No one cared, for, on my remonstrating, my head servant told me that he had arranged with " the Guardian. I ordered the clothes back to the ship, but when I got into Bagdad I found them washed " and ironed ready for use."

† Persian pilgrims returning from Nedjef and Kerbela, also from Mecca, eluded the quarantine stations established on the frontier, by travelling, when it served their purpose, along a route by way of Kut-el-Amarah and Hawiza, which was not guarded by a quarantine station until, apparently, some two months after the appearance of plague in the district adjacent to Shuster. [See with reference to the outbreak in Khuzistan in connexion with other outbreaks in Persia, Memorandum No. III., p. 37.]

Towards the close of June, when the outbreak was rapidly declining and had already ceased, the Commission in Bagdad reported to the General Board of Health, Constantinople (Despatch of Mr. Dickson, 4th July 1876), "that the moment had "arrived to take steps to prevent, if possible, the recurrence of the malady in those "parts;* and it recommended the adoption of a plan similar to that suggested by "Mr. Colvill." The plan here referred to is, no doubt, that stated in Mr. Colvill's report of 5th June 1875 (of which the descriptive portion was included in a note appended to my previous Memorandum). This plan is as follows:

"I should suggest," he writes, "that during the summer all villages and groups of "huts of the fourth class, such as Um Nejeris and Fowar (Fawwar) be destroyed. "The proposition is not so formidable when we consider that, on an average, each of "these huts costs less than 3 rupees. Wood, it is true, is scarce, but where there are "beams they might be smoked and scorched, and the whole of the villages might be "carried and rebuilt with little inconvenience to the inhabitants, and much benefit to "them, a few hundred yards from their present situation, while compensation might "be made out of the overflowing coffers of the International Sanitary Commission at "Constantinople."

The fourth class of villages referred to in the above extract are thus described: "In "this class (the only class which has been affected with plague, according to Mr. "Colvill), the villages or groups of huts are permanent. They are on ground which is "a foot or two lower than the surface of the water in spring, and the ground is so "saturated with water that the refuse of the village is neither absorbed nor can it be "evaporated, for it acquires fresh moisture from the ground, and this refuse acquires "the form of a bluish-black oily fluid, which surrounds the huts and covers the paths, "and stains the walls two feet from the ground, and, in fact, the village is in such a "state of filth that it requires to be seen to be believed."

Subsequently the Bagdad Commission (24th July 1876) informed the Ottoman General Board of Health that the expense of destroying and displacing the reed-built villages would not be great; and it suggested that this measure should be applied first to Kefl and Kufa. The Commission, moreover, recommended that medical officers should be stationed in the various towns which are to be purified, in order to carry out such measures as might be needed there.

These recommendations were approved by the General Board of Health and authorised by the Porte, but it was found impracticable to carry them into effect, in consequence of the diminished income of the Board, occasioned, it is stated, by the stagnation of trade caused by the political complications then existing, to the stoppage of the pilgrim traffic in Mesopotamia, owing to the prevalence of plague there, and to other causes.

To complete this relation, it is necessary to state briefly the precautionary measures taken in Persia, in the Persian Gulf, in India, and by the Russian Government in the Black Sea.

(*d.*) In the Persian Gulf.

In March 1876, on the news of the reappearance of plague in Mesopotamia reaching Teheran, a Board of Health was formed there, consisting of the Minister of Public Instruction (President), the Director of the College, Dr. Tholozan, Physician to the Shah, five Persian medical officers, Sir J. Dickson, Physician to the British Legation, Dr. Barker, Medical Officer of the Telegraphic Department, Dr. Comninsky, Physician to the Russian Legation, and Dr. Castaldi, Ottoman Sanitary Delegate in Persia. This Board directed—

(*a.*) The interruption of communication between Persia and Mesopotamia, and the establishment of a 15 days' quarantine on the principal lines of intercourse;

(*b.*) The establishment of a sanitary cordon (as part of the above scheme) at Kari Shireen on the frontier, where it is traversed by the principal route from Bagdad;

(*c.*) The repulsion from the Persian ports in the Gulf of all arrivals from Basra and Fao until after the performance of a 15 days' quarantine at the Island of Khizr,† opposite to Fao (where the Ottoman quarantine station at the mouth of the Shat-el-Arab is established): men-of-war, having on board medical officers, to be exempt from this regulation.

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* In a telegram dated 21st May 1876, Consul-General Nixon states that, with the view of preventing the recurrence of plague, the Pasha had begun draining the marshes in the vicinity of Bagdad.

† The locality selected here was found unhealthy, and the quarantine station appears to have been afterwards removed to the mouth of the Karun river, in the Shat-el-Arab.

Immediately on the order as to quarantine at Kari Shireen, on the frontier, reaching the officials there, it was converted into a means of extorting money (Despatch of Sir J. Dickson, 9th April 1876), for not only were arrivals from Bagdad put into quarantine, but all departures from Persia to Bagdad were equally placed under restraint.

With respect to quarantine in the Gulf, it does not appear that any proper provision for performing quarantine exists on the Persian littoral; and such provision as was made had to be extemporised. Medical officers were appointed to inspect vessels and supervise quarantine; and Hajji Jabbar Khan, the Governor of Mohamrah, hired two small vessels, which were stationed at the Island of Khizr for quarantine purposes.

Before the proposed quarantine could be carried out, it was necessary to obtain the assistance of Great Britain; for Persia has no armed force afloat by which obedience to her quarantine regulations could be enforced. The responsibility was, in fact, thrown upon England of enabling Persia to protect her littoral in the Gulf from plague; and an appeal was made to the Indian Government to give the required assistance. This assistance was given (see telegram from the Viceroy, dated Simla, 22nd June 1876).

While the foregoing measures were under discussion by the Board of Health in Teheran, the British Resident at Bushire had not been inactive in reference to plague. Information of the reappearance of the disease on the Euphrates was communicated to him by Colonel Nixon, in a telegram on the 2nd of March 1876. He at once took measures for warning the local Persian authorities, the Representatives of other foreign nations in Bushire, the British Agents on both sides of the Gulf, and the merchants trading in the Gulf; and the Residency Surgeon (Dr. R. M. Wall) offered the following suggestions, which were adopted by the local authorities, for protecting the port:—

(1.) That all vessels from Basra be inspected.
(2.) That quarantine upon all passengers (from Basra) to Bushire be enforced.
(3.) That healthy passengers be separated from the infected ones.

In carrying out these suggestions, it was proposed that native craft should be quarantined for five days, after the lapse of which period they would undergo a second inspection, and, should no suspicious cases be discovered on board, would then be given free pratique. Should suspicious cases occur, these were to be removed to hulks moored apart, and prepared to receive them, and a longer period of quarantine was to be enforced on the crews and passengers of vessels from which sick persons were removed.

The Persian authorities undertook to take charge of their own subjects, and it was proposed that owners of vessels under British protection should be held responsible for expenses in carrying out such measures as might be considered necessary for the isolation and care of their passengers and crews. A circular memorandum was addressed by the British Resident to all merchants likely to have steamers consigned to them, calling on them to furnish information of the expected periods of arrival of such vessels in view of facilitating the execution of the precautionary measures that were being taken.

The Residency Surgeon appears to have undertaken the inspection of ships arriving off Bushire, and the Residency Apothecary the inspection of native craft. The work of inspection had to be carried on by the aid of an open boat, four miles from the shore, where the anchorage is situated. In rough weather this work was very laborious, and occasionally the inspecting officer was not able to reach the vessel in time to examine all the passengers. "This (was) especially the case" (writes the Residency Surgeon, 28th March 1876,) "with Hajjis, who will not obey the orders of the captains, "and cannot be restrained from getting into native boats alongside; and it is from "Hajji ships in particular that the danger of importation of disease arises." To meet this difficulty, the Residency Surgeon suggested that all vessels from infected ports should remain in the outer roads till he had inspected them; and pointed out that as the distance from the shore is 8 miles, a steam-launch would, in that case, be necessary to enable him to get to them.

It is to be presumed that the local arrangements at Bushire as to ships from infected ports would be superseded by the instruction as to the repulsion of such ships issued by the Board of Health at Teheran, if the latter were put in force. The papers, however, give no information on this subject.

The Indian Government instituted (June 1876) a 15 days' quarantine, including the days of voyage, against infected ports in the Persian Gulf, at Karachi, Bombay, and Aden; not, indeed, it would appear, from any faith in the measure as protective of India, but to prevent all ships sailing from the ports named to the Red Sea being (c.) In India.

subjected (as threatened by Egypt) to a like period of quarantine in Egyptian ports.

(*f*.) In Russian ports.

In the course of May 1876, the Russian Government issued an Order requiring that the bill of health of all vessels arriving at Russian ports from the southern ports of the Black Sea should be countersigned by a Russian Consul stationed on that coast. (Despatch, Constantinople, 24th May).

(*g*.) In Mesopotamia, 1877.

With reference to the measures adopted in Mesopotamia since the reappearance of plague there at the close of the past (1876) and beginning of the present year, the Ottoman General Board of Health determined on the 4th April 1877, that "it would "abstain from the use of any restrictive measures applied within or around Bagdad, "and that it would limit the efforts of its agents there to assisting and isolating as far "as possible those smitten by the malady, removing the occupants away from the "apartments where they were taken ill, so as to cleanse and disinfect them. In "order, however, to protect the adjoining provinces, quarantine measures, assisted "by a military force, would be established at the same stations where they were "carried out last year" (Despatch, Dr. E. D. Dickson, 4th April 1877).

With regard to Bagdad, on the occurrence of suspected cases of plague in the city in February, a Sanitary Commission was appointed "for the purpose of making house-to-"house visits, cleansing houses and streets, disinfecting latrines, and filling up all "the stagnant pools in the town. When a house was attacked by the malady, its "inmates were removed from it into huts outside the city, and the sick separated "from the healthy." These measures, it would appear, however, so far as they affected sick persons and dwelling-houses, gave rise to dissatisfaction among the Mahommedan population. Complaint was made to the authorities of the great inconvenience caused by their execution, and a request was preferred that the old system of surrounding the infected houses (which the previous year had helped to provoke serious rioting) might be reverted to in lieu of the above-mentioned mode of dealing with them. The complainants, moreover, in addition, declared their aversion to all sanitary regulations, as they believed them to be contrary to the principles of their faith (Despatch, Dr. E. D. Dickson, 15th March 1877).

June 1877.

APPENDIX TO FOREGOING MEMORANDUM.

A German physician, Dr. Bernhard Beck, resident in Bagdad, in a letter dated the 21st March 1876, of which a translation has been forwarded by Consul-General Nixon,* questioned the accuracy of diagnosis of the disease then prevalent in Bagdad and the adjacent country as plague. He wrote of the disease as "a new disease" hitherto unobserved, which, "with the exception of swelling "of the glands," resembled very closely the malarious fevers (intermittent and pernicious) of the country; and he proposed to name the disease "bubonic fever," or "pestine or pseudo-plague," and held that it stood "in the same relation to plague as cholerine to cholera."

In a communication, moreover, dated the 31st March 1876, and published in the *Wiener Medizinische Wohchenschrift*, under the signature B. B. (Nos. 20, 21, 23, 1876), Dr. Beck, after having seen 100 cases, wrote: "I do not hesitate to say that we have here to deal with a malarious "fever epidemic, somewhat of a pernicious intermittent and remittent type, and I am, therefore, "of opinion that we have not to do with the actual plague. As this fever is almost always "accompanied by swelling of the glands, that appears to be the reason why it has been called "plague." In this communication Dr. Beck proposed to name the disease "febris intermittens "bubonica."

The following is Dr. Beck's description of the disease, given in his letter of the 21st March:—

"On the first day rigor; on the next, vomiting of a yellowish-green bilious liquid, and appear-"ance of adenitis, chiefly axillary, inguinal, and crural; the tongue moist, white, velvety; face "little altered; pulse 100 to 140; temperature 39° to 41·5° (Centigrade); buboes hard, painful, "up to size of fist. In severe cases insensibility, coma, somnolence, delirium, dry tongue, livid "face, petechiæ on extremities, albuminous urine. As regards contagiousness I possess no sufficient "proofs. After a laxative (patients are generally constipated), and after the action of large doses "of quinine, I observed in most cases a remarkable improvement." Subsequently Dr. Beck stated, that "large doses of quinine were very effectual in the pernicious marsh fever, the pretended "'plague.'"

From no other source has information reached this Department of the successful trea tment of th bubonic malady by quinine. It will be observed that Dr. Beck, as Dr. Naranzi in 1867, (see foot-note in my previous Memorandum, and p. 10 of these papers,) while doubting that this malady is "plague," believes it to be a new form of malarial affection. Dr. Naranzi proposed to designate the disease "non-contagious plague-like typhus (*typhus loimoïde non-contagieux*)."

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* This letter appears to have been addressed to one of the Vienna medical journals, but I have not been able to discover the particular journal in which it appears.

MEMORANDUM No. III.—1877 and part of 1878.

(*From the Report of the Medical Officer of the Local Government Board for* 1877.)

In two previous memoranda (the first of which will be found in the Report of the Medical Officer for 1875, p. 82 [p. 5 of these papers]; and the second in the Report of the Medical Officer for 1876, p. 285 [p. 23 of these papers]) I have described the modern history of Levantine plague, and its progress to the close of the year 1876, and for part of the year 1877. In the present memorandum I propose to continue and complete the history of that progress for 1877 and for part of 1878, and to give an account of an outbreak of the bubonic plague of India (the "Pali plague" or "Great-plague," *máhámari*) in 1876–77, including certain facts as to the probable existence of plague in Yünnan.

Since the apparent cessation of plague in Egypt in 1844, after several centuries of prevalence there and in neighbouring countries, eight reappearances of the disease had been recorded in the Levant up to the close of 1874, namely: (1, 2), in Western Arabia, in 1853 and again in 1873–74; (3, 4), in the province of Bengazi, Tripoli, in 1858–59 and again in 1873–74; (5, 6), in Persian Kurdistan, in 1863 and again in 1871; and (7, 8), in Mesopotamia, in 1867 and again in 1873–74. The outbreak of 1873–74 in Mesopotamia was the beginning of a diffusion of plague in the districts bordering the lower courses of the Euphrates and Tigris, before the junction of the two rivers to form the Shat-el-Arab, which continued, with intervals of dormancy during the hot season, throughout 1874–75, 1875–76, and into 1877. Since the hot season of 1877 no information of the existence of plague in Mesopotamia has been received, and it would appear as if the diffusion which began in 1873 had then come to an end.*

An offshoot of this diffusion, as it was believed at the time, occurred in 1876, in the towns of Shuster and Dizful and the surrounding districts, Khuzistan, south-western Persia. The outbreak of plague in the localities named was very fatal, and it is now known that it was the first of a series of circumscribed appearances of plague in Persia seemingly disconnected with each other, and with the exception of the Schuster-Dizful outbreak, having no obvious relations with the previous diffusion of the disease in Mesopotamia.

The following is a brief account of the several outbreaks of plague or probable plague which have occurred in Persia, following upon the Shuster-Dizful outbreak, to the time of the latest official information.

Northern Persia.

Khorassan, 1876.

In December 1876, a very rapidly fatal disease, characterised by intense fever, headache, delirium, and the appearance of inflammatory swellings in the groins, the armpits, and behind the ear, appeared in two villages of Northern Persia, named Jaferabad and Dezedje, 25 leagues from the south-east angle of the Caspian. These villages lie in a large and beautiful valley, at an altitude of about 1,000 metres, a kilometre distant from each other, four leagues to the south of Sharoud, and about two miles from the route between Teheran and Meshed. This malady continued among the population of the villages until the end of January 1877.†

Ghilan:—Resht, 1877–78.

In March 1877,‡ plague broke out in Resht (estimated population 20,000), the capital of the province of Ghilan, near to the North-western corner of the Caspian Sea.

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* With reference to the appearance of plague in Bagdad in 1877, the earliest cases reported officially to the Turkish authorities occurred on the 17th January, and it was not until the middle of March that the existence of the disease in the city would appear to have been fully recognised by them. A return of the deaths from plague among the Jewish community of Bagdad during the outbreak of 1876–77, furnished to Surgeon-Major Colvill by the Chief Rabbi, and enclosed by that gentleman in a despatch dated the 4th September 1877, shows that three deaths were recorded in December 1876, one on the 2nd of the month, the other two on the 20th and 21st respectively.

In Appendix A. attached to the present memorandum, I have given certain further details descriptive of plague, as observed in the province of Bagdad, derived from Mr. Colvill, and which will serve to make more complete the account of symptoms given by that gentleman in his Report printed with my first memorandum. [In Appendix F. I am now enabled to add, through the courtesy of the Epidemiological Society, an important paper on the character of epidemic plague as observed in Mesopotamia in 1876–77, by Dr. E. D. Dickson, physician to the British Embassy, Constantinople.—J. N. R.]

† Dr. Tholozan, *Comptes Rendus de l'Académie des Sciences*, Vol. 85 (1877), p. 432.

‡ The Chancellor of the Russian Consulate-General at Tabriz, M. Schulzewski, has reported, according to Dr. Castaldi, the delegate of the Ottoman General Board of Health at Teheran (*see* Appendix B. following), that early in January 1877, there had occurred at Baku, on the Caspian shore of Transcaucasia, within Russian territory, several cases of a bubonic typhoid malady. In two houses seven cases of this malady occurred, all ending fatally in two or three days.

This town would appear to have been free from the disease since 1830, during which year half the population is believed to have been carried off by it, and the prosperity of the place received a check from which it has never recovered.* Although the malady is stated to have first shown itself in March 1877, the nature of the disease was not clearly recognised until the month of May. The history of its spread and of its prevalence among the population is very imperfectly known, no trustworthy account of the attacks and deaths having been made public by the Persian authorities. The malady prevailed in the town throughout the year, and cases were recorded in January of the present year (1878). I subjoin descriptions from several sources of the symptoms of plague as observed in Resht, and of the local conditions under which the disease occurred. (*See* Appendices B., C., D.)

This outbreak of plague was not confined to the town of Resht. It extended to several villages in the surrounding district, and it is stated of one of these, Felek-Dah, 8 miles to the south, that it was almost depopulated.

Mr. Consul Churchill, C.B., writing from Resht, under date September 12th, 1877, states that at that time it was calculated that 4,000 deaths had occurred from plague in the town and surrounding villages.

Azerbijan :— Khalkal district (1877).

Mr. Consul-General Abbott, writing from Tabriz under date the 1st October 1877, states that from information received from the Russian Consul-General there, which had been confirmed by the inquiries of a physician, Dr. Aparine, made by direction of the Russian Government, that cases of plague had occurred in the Khalkal district of the province "a month ago."

? Astrabad the Perso-Afghan frontier, 1877.

On the 13th September 1877, the presence of plague in Astrabad was reported to Her Majesty's representative at Teheran, Mr. Taylour Thomson, C.B., but the news does not appear to have been confirmed. On the 25th of the same month Mr. Thomson received information from Meshed of a disease which was said to have broken out about a month before amongst the nomad tribes of Herat, especially among the Jamsheedies. The patient in this disease is described as being attacked with a slight bleeding first from the nose, then from the throat, and afterwards succumbing in from 24 to 40 hours.

Persian Kurdistan :— So-uj-Bulak, 1878.

In January of the present year, 1878, plague would appear to have broken out in the district of So-uj-Bulak, Persian Kurdistan. This district, if not partly or indeed wholly within, lies adjacent to the area which was the scene of the outbreak of plague in Persian Kurdistan in 1871. (*See* Mem. in Report of Medical Officer, 1875 [p. 11 of these papers].) Dr. Bogatzelos, the medico-sanitary officer stationed at Suleimanieh, made an inspection of the district of So-uj-Bulak for the Ottoman General Board of Health, in April 1878, and the results of his inspection are thus given in telegrams from the Health Department at Bagdad, dated the 4th and 5th May 1878.

"Dr. Bogatzelos visited the villages of Ag-givan, Buhao, Giamert, and Miabetin. In all he found cases of plague. The malady is said to have broken out about four months back. Many persons have been attacked and many were still suffering from it; most of these, however, are kept hidden in order to conceal the existence of the outbreak. In the village of Ag-givan, out of 200 attacks in a population of 1,000 souls, 150 had perished; and of 10 persons living together in a house, only one remained alive. Dr. Bogatzelos examined several patients in various stages of the disease, and he has no hesitation in declaring this to be *the true plague*, characterised by fever, thirst, vertigo, glandular swellings in the armpits, groins, and neck, carbuncles, petechiæ and hæmorrhage from the stomach."

From the date of the above telegrams (4th and 5th May 1878) no information has been received of the existence of plague in any part of Persia.

The bubonic plague of India (Máhámari).

At the time when I wrote my second memorandum I was unaware that there had been a recent outbreak in India of a fatal bubonic febrile disease, simulating, if not identical with Levantine plague. I add the following notes respecting this outbreak,

* "Very few persons in Resht are old enough to recollect the days when this town was attacked by real plague. It was towards the year 1832 that this deadly malady manifested itself. In a few weeks half the population of a very flourishing town, numbering upwards of 40,000 inhabitants, had been laid low, and the remainder had fled in all directions. Resht for a while became a charnel house a city of the dead. No living creature was to be seen in it, and those who had been abandoned by their friends when stricken by the disease died from sheer want. When the people returned to their homes the disease had spent itself, and the population was reduced to 8,000 inhabitants. The putrefying remains of the dead were buried in the homes in which they were decaying. Property changed hands in all manner of ways. Some who had enjoyed wealth were reduced to the threshold of poverty, their goods and chattels having been appropriated by their neighbours; while others had suddenly merged into unexpected opulence by the extinction of their richer relatives. Such were the effects of plague when it last appeared at Resht."—*Mr. Consul H. A. Churchill, C.B.*, Resht, May 24th, 1877.

and the disease in question, as necessary to complete the account given in the several memoranda on the modern history and recent progress of Levantine (bubonic, oriental) plague and plague-like affections.

Máhámari in Kumaun, 1876–77.

In November 1876 a rapidly fatal disease, known as *Máhámari* (the "great plague," a term also applied to cholera,) and locally designated *gola* or *phutkia* (bubo)—the several terms being generically used in the sense of *pestilence*—became prevalent in the mountainous district of Kumaun, on the southern slopes of the Himalayas. Forty-one of the hill villages in this district suffered from the malady in the course of 1876–77, and in 40 of these villages 291 persons were attacked by it, of whom 277 died. Mr. C. Planck, the Sanitary Commissioner for the North-western provinces and Oudh, inspected the infected district at the time of the prevalence, and he has given a detailed account of the results of his inspection in the report of his proceedings in the North-western Provinces for the year 1876 (*Ninth Annual Report of the Sanitary Commissioner for the North-western Provinces*, Allahabad, 1877, pp. 40-95). I subjoin extracts from Mr. Planck's report descriptive of *Máhámari* as observed by him in 1877. (Appendix E.) He concludes that the malady is identical with true (Levantine, bubonic) plague. It would appear to be the same disease also as the Pali plague of Rajputana and contiguous provinces to the westwards. I note here the recorded periods of prevalence of *Máhámari* for the purpose of comparison with the periods of prevalence of the several reappearances of plague in the Levant, Arabia, and Persia, which I have described in this memorandum, and the two previous memoranda on the subject.

Máhámari in Cutch, Kattywar, and Sindh, 1815–20.
Garhwál, 1823, and 1834–35.
Pali, 1836.
Kumaun, 1847–53.
Rohilcund, 1853.
Garhwál and Kumaun, 1859–60, and 1870.
Kumaun, 1876–77.

Máhámari seems to have been first noted in Cutch in 1815, and during the six years 1815-20 the disease prevailed in parts of Cutch, Kattywar, and Sindh.* In 1823 the malady is reported to have appeared among the Himalayas in the district of Garhwál, a district lying to the north of, and contiguous to, Kumaun. In 1834–35 it was prevalent in parts of Garhwál. In 1836 the disease broke out at Pali, in Marwar, Rajputana (whence the name of *Pali* plague), and it subsequently prevailed in several parts of the Marwar and Meywar districts. From 1847 to 1853 Máhámari seems to have been present in a more or less active form in, or at least rarely absent from, Kumaun, and in the last-named year the malady was also observed in Rohilcund, the district lying immediately to the south of Kumaun. In 1859–60 the disease was again active in both Kumaun and Garhwál; also in 1870. From 1870 to the outbreak of 1876–77 in Kumaun there does not appear to have been any record of appearance of the disease.

In view of the history of the several reappearances of Máhámari in Kumaun and Garhwál, and having regard to the remoteness of the villages in which it has manifested itself, and the little intercourse which appears to be had with them, the suspicion can scarcely be avoided that the disease is endemic among the hill villages of the two districts. It is possible also that the disease may exist in an endemic form in other parts of the same vast mountain system. Mr. Baber, in his report on the route followed by Mr. Grosvenor's mission between Tali-fu and Momein,† has the following observations:—

"Of the three rivers, Mekong, Shweli, and Salwen, the Salwen is, in the parallel at which we crossed, beyond question the largest. The 'Topography of Yünnan' does not give its breadth, but draws special attention to its evil reputation for malaria. The Lu River, anciently called the Nu, is met with 20 miles south of Yung-ch'ang. The mountains on both banks are exceedingly steep, and its exhalations are so poisonous that it is impassable during summer and autumn.

"Another strange disease which haunts this and some other of the valleys of Yünnan bears, in some respects, a resemblance to the plague of London described by Defoe.

"Its approach is indicated by the eruption of one or more minute red pustules, generally in the arm-pits, but occasionally in other glandular regions. If several pustules appear the disease is not considered so hopeless as when they are few. The sufferer is soon seized with extreme weakness, followed in a few hours by agonising aches in every part of the body; delirium shortly ensues, and in nine cases out of ten the result is fatal.

"It often happens that the patient suddenly, to all appearance, recovers, leaves his bed, and affirms that, beyond a slight sensation of weakness, he feels thoroughly convalescent. This is invariably a fatal sign; in about two hours the aches return, and the sufferer dies.

"True recovery is always very gradual. This is the account given us by a French missionary, who has spent half a lifetime in Yünnan: the native version includes all the above facts, but

* Under the title "The Bombay Plague of 1818," a fatal bubonic febrile malady, described by Dr. Glen, is recorded in Dr. James Ranken's "*Report on the Malignant Fever called the Pali Plague*" (Calcutta, 1838), p. 224.

† Parliamentary Paper, China, No. 3 (1878), pp. 22–23.

involves them in a cloud of superstitious accessories; for instance, all parts of the sick room are occupied by devils, even the tables and mattrasses writhe about and utter voices, and offer intelligible replies to any one who questions them.

"Few, however, venture into the chamber. The missionary assured me that the patient is, in most cases, deserted like a leper, for fear of contagion. If an elder member of the family is attacked the best attention he receives is to be placed in a solitary room, with a vessel of water by his side. The door is secured, and a pole laid near it, with which twice a day the anxious relatives, cautiously peering in, poke and prod the sick person, to discover if he retains any symptoms of life.

"Père Fenouil (there is no objection to his name being mentioned) had himself witnessed many cases of the disease, and lived in infected towns. He attributes his own safety to the precautions he took of fumigating his premises, and keeping charcoal braziers constantly burning, to such an extent, indeed, that his house on one occasion actually took fire. He states that not only human beings, but domestic animals, and even rats, are attacked by the pestilence.

"Its approach may often be known from the extraordinary movements of the rats, who leave their holes and crevices, and issue on to the floors without a trace of their accustomed timidity springing continually upwards from their hind legs as if they were trying to jump out of something.

"The rats fall dead,* and then comes the turn of the poultry; after the poultry have succumbed, pigs, goats, ponies, and oxen successively die off.

"The good father has a theory of his own that the plague is really a pestilential emanation slowly rising in an equable stratum from the ground, and as it increases in depth, all animals are, as it were, drowned in its poisonous flood; the smaller creatures being first engulfed, and man, the tallest of Yünnan animals, suffering last.

"The Christian converts suffer less than their pagan countrymen, from the superior cleanliness which, as we were informed, their faith inculcates.

"We ourselves never saw any cases of the plague; but we met one native of South-Western China, no less a personage than the Governor of the Yünnan province, T'sên, a quiet sober-spoken veteran of a hundred battles, deeply marked between the eyes with a scar inflicted by a rebel bullet. He had undergone two attacks; the second was less violent than the first. He remembered nothing of the acute period of the illness, but in both cases, his recovery was gradual and protracted.

"He attributed it to the influence of demons, and we afterwards heard a characteristic instance of his faith in his own diagnosis.

"The head-quarters of his division during the Mahommedan rebellion were situated in a plague-stricken town, and when the infection began to attack his troops, T'sên had all the gates closed except that in the southern wall, and then sent in his soldiers with orders to slash and pierce the air in every corner that could possibly harbour a demon. After this preliminary slaughter the men were formed in line against the inside of the north wall, and gradually advanced upon the south gate, hemming in the invisible fiends, and ultimately driving them with a final rush through the gate, which was immediately closed, and a strong guard placed outside. But somehow or other the goblins contrived to regain the interior of the city, by what means has not been ascertained, but it is surmised that they climbed over the wall.

"We have now some explanation of the evil repute borne by this valley. It is certainly pestilential; the river was, until a late period, the boundary of China; as is indicated by the existence of the 'old city' on its opposite bank. Border regions, 'debateable grounds,' are notoriously the birth-places of myths and marvels. We relegate these lone recesses to the future explorer."

Postscript, February 1879.—The *Journal de St. Pétersbourg* for the 26th January (7th February) 1879, contains the following paragraph in a notice of the report of the Medical Department of the Russian Minister of the Interior for the year 1877.

"La peste de Sibérie présenta en tout 251 cas de maladie, avec un chiffre de mortalité s'élevant à 21·5 p.c. Dans la province de Viatka il y a eu 41 cas, dans cette de Tchernigow 32 cas. On sait que sur la frontière de Perse la peste était en permanence depuis trente ans jusqu'en 1871. Depuis, les mesures de quarantine avaient relâché de leur rigueur, mais en 1877 la peste a repris à Rescht et a fait 3,000 victimes."

From this statement, based upon an official report, and in which the term *peste de Siberie* seems to be used as synonymous with the bubonic plague observed in Persia in 1877, it would appear that this disease had manifested itself in several localities of Eastern and Southern Russia in Europe in the course of 1877. The recent outburst of plague in the province of Astrakhan (? November 1878—February 1879), it is, therefore, to be inferred, is a further development of the malady which had appeared in Russia the previous year, when the disease was also prevalent on the Caspian littoral of Northern Persia. But details of the prevalence of plague in Russia in 1877 and 1878 are yet wanting.

* [The death of rats is recorded as one of the phenomena observed in several of the hill villages of Kumaun during the late outbreak of Máhámari there. *See* Appendix E.—J. N. R.]

In the accompanying Maps I have indicated (Map I.) the topographical distribution of plague in Mesopotamia in the successive years of prevalence there since the development of the disease in 1873; and (Map II.) the geographical distribution of the several outbreaks of the malady since its appearance in 1853.—J.N.R.

APPENDICES TO FOREGOING MEMORANDUM.

A.

PLAGUE IN THE PROVINCE OF BAGDAD, 1876–77.—*Extract from a Paper communicated by Surgeon-Major Colvill, Civil Surgeon, Bagdad, to the Epidemiological Society of London.*

"In the beginning this disease (plague) is often not to be distinguished from ague, though sometimes before fever sets in the patient, instead of merely complaining of pains in the limbs, which are the premonitory symptoms of ague, becomes distracted, tosses about in evident fear of something he cannot describe, and if he is absent from his house runs home like a maniac and throws himself on his bed. The fever which sets in lasts from 24 to 30 hours, his eyes becomes red and turbid, his tongue appears swollen and fissured, sometimes black, sometimes white, as if cotton were upon it; he has to be spoken to twice or three times before he can understand the question; he will then probably sit up if he can before answering, and his head will roll from side to side and his face become flushed like that of a drunken man. Sometimes no answer is to be got to a question, however often it may be repeated, or if an answer only a moan. Sordes are invariably about the teeth and gums. If the patient can speak he demands water, for the thirst is intense, and he will probably complain of a pain as if a knife were stabbing him in the epigastric region, or as if it were full of burning charcoal. Both last year (1875) and this (1876) there has been comparatively little vomiting, and when it did appear it was generally bilious, though sometimes bloody, and in the case of one patient I particularly noted when she vomited blood that at the same time blood came from the rectum and vagina: it is almost unnecessary to say she sank rapidly. During the fever stage the breathing is hurried, the pulse very rapid, and the temperature of the skin about 100, while the thermometer in the shade is 93. With the fever, or oftener some hours after it has set in, the lymphatic glands enlarge; but I have known cases in which the patient, apparently in good health, has screamed out that he has been stabbed in the groin. These latter are cases in which the glands enlarge *before* the fever sets in, and they are quickly fatal. As will be seen by the Table (1.) appended, the glands which chiefly enlarge are those of the groin, next those of the axilla, after that those of the neck, and I have seen two or three cases of the glands in the bend of the elbow being swollen, but never one instance of enlargement of the popliteal glands. On occasions the glands in more regions than one enlarge. These glands in enlarging are either oval or round, one in a string being larger than the others which gradually diminish as they recede from it, the largest gland being sometimes the size of a small orange. Till now I had imagined that carbuncles were a favourable sign; I see, however, that of 11 cases registered in Fahama in which carbuncles appeared, nine died. The urine is generally natural, abundant, and pale coloured. Generally there is obstinate constipation; diarrhœa when it occurs is considered a favourable sign. Petechiæ are almost without exception to be considered as fatal signs; they appear generally only a few hours before death. Sometimes there is a return of the fever, which then becomes intermittent, but I do not consider this to be a return of the fever of plague, because every serious disease in these parts, whether fatal or otherwise, generally terminates in an attack of ague. Taking the whole of the register there were 4,585 cases and 2,556 deaths registered in Bagdad during 1876. This gives a proportion of deaths to attacks of 55·7 per cent. Of the cases 2,165 are males and 2,420 are females. Of the deaths 1,134 are males and 1,422 are females. I do not know how to explain why a greater number of females should have been attacked, for though, at first sight, it might be supposed that as this is a Mahommedan country the explanation is easy, still, as I have previously shown, few of the poor have more wives than one, and this is a disease which has essentially attacked the poor, not one per cent. of those attacked having lived in houses of the better class. In Table I. I have endeavoured to show the age at which a person is most liable to be attacked, but the numbers are insufficient for more than mere general conclusions. The fœtus has been in some cases attacked; and in one case of premature birth which I saw where there were twins, one child was dead with the glands in the left side of the neck swollen, while the other child is now alive and doing well. It will be seen from Table II. appended, that of 534 deaths 311 occurred within the first three days. After this time the risk of death gradually diminished as the days went on, so that the natives themselves were pretty correct when they said that a patient may consider himself safe after the seventh day. I think that the proportion of about 60 per cent. in the first three days is much under the mark, for I suspect that many if not most of the cases entered in the register as simply "attacked" and "dead" are those of people who died within that time. It has been said that the strong and healthy are more liable to be attacked than the sick and the weakly, but that is a point I am unable to settle till I know what proportion the sick and the weakly bear to the whole population."

TABLE I.—Showing, of 402 Cases of PLAGUE, the Numbers attacked at different Ages, and the Frequency of Enlarged Glands (Buboes) in Various Regions, and of Carbuncles.

Age in Years.	Sex.	Frequency of Enlarged Glands in various Regions.								Carbuncles.	Total.
		Neck.	Axilla.	Elbow.	Groin.	Crural.	Other Regions.	More Regions than one.	Glands enlarged: position not mentioned.		
1 and under	Males	1	—	—	—	—	—	2	—	—	3
	Females	—	4	—	—	—	—	—	2	—	6
1–12	Males	9	32	—	42	2	1	2	—	3	91
	Females	5	27	—	15	—	—	1	2	3	53
12–30	Males	5	32	—	33	4	1	4	2	2	83
	Females	4	25	—	34	1	—	—	—	1	65
30–40	Males	—	12	—	24	—	—	1	—	—	37
	Females	—	5	—	? 15	—	—	—	—	2	? 22
40–60	Males	1	7	—	9	1	—	3	—	—	21
	Females	—	8	—	5	1	—	—	—	—	14
60 and over	Males	—	4	—	2	—	—	—	—	—	6
	Females	—	—	—	1	—	—	—	—	—	1
Total	Males	16	87	—	110	7	2	12	2	5	241
	Females	9	69	—	70	2	—	1	4	6	161
Grand Total		25	156	—	180	9	2	13	6	11	402
Recoveries		6	47	—	52	—	—	5	—	2	112
Deaths		19	109	—	128	9	2	8	6	9	290

TABLE II.—Showing the Duration of 534 Cases of PLAGUE at Different Ages.

Age in Years.	Sex.	Time in Days of Death after attack.													Total.
		1.	2.	3.	4.	5.	6.	7.	8.	10.	12.	16.	20.	Over.	
1 and under	Males	2	1	1	—	—	1	—	—	—	—	—	—	—	5
	Females	4	1	2	1	—	—	—	—	—	—	—	—	—	8
1–12	Males	17	12	15	11	11	3	2	—	—	—	—	2	—	73
	Females	23	22	21	15	7	5	—	1	4	—	—	5	—	103
12–30	Males	24	15	15	11	12	7	1	5	3	4	—	—	—	97
	Females	24	9	18	14	9	5	6	4	4	1	—	1	—	95
30–40	Males	5	5	7	4	4	1	1	—	—	1	—	1	—	29
	Females	14	5	9	7	7	2	—	2	—	1	1	2	—	50
40–60	Males	2	5	6	4	1	—	—	1	2	1	—	—	—	22
	Females	9	5	7	5	7	2	1	1	1	1	—	—	—	39
60 and over	Males	—	—	3	2	1	—	1	—	—	—	—	—	—	7
	Females	2	—	1	2	1	—	—	—	—	—	—	—	—	6
Total	Males	50	38	47	32	29	12	5	6	5	6	—	3	—	233
	Females	76	42	58	44	31	14	7	8	9	3	1	8	—	301
Grand Total		126	80	105	76	60	26	12	14	14	9	1	11	—	534

B.

PLAGUE IN RESHT, 1877.—*Extracts from a Report dated the 6th June* 1877, *made by Dr. Castaldi, Ottoman delegate, and communicated to the Sanitary Council, Teheran, 24th June* 1877.

" Envoyé à Rescht par l'Administration Sanitaire Ottomane dans le but de constater la nature d'une maladie suspecte qui depuis quelque temps faisait des victimes dans cette ville, j'y suis arrivé le 27 Mai. Sans perdre un instant, je me suis mis à la recherche des malades, car l'essentiel pour moi était avant tout la détermination précise de la nature de la maladie, les autres éléments d'étude n'ayant évidemment qu'une importance secondaire. J'ai été servi à souhait dans cette recherche par la présence de M. le Dr. Iliine, envoyé à Rescht dans le même but par le Gouvernement Russe du Caucase et arrivé la veille. Il avait déjà visité plusieurs malades sur le compte desquels il avait pris quelques notes et il eut l'amabilité de m'accompagner dans deux maisons situées à peu de distance du Consulat de Russie.

" Là se trouvaient quatre personnes atteintes de la maladie en question. Dans l'une de ces maisons j'ai vu trois malades, un homme de 35 ans environ, une femme qu'on m'a dit être enceinte et âgée de 27 ans, et un enfant de 4 à 5 ans. Ces trois malades gisaient sous un vérandah donnant dans un petit jardin ; l'espace occupé par eux ne dépassait pas trois mètres carrés. L'homme était malade depuis quatre jours, la femme depuis trois, et l'enfant depuis la veille. Le premier, d'une constitution faible, scorbutique, était couché sur le dos, il avait l'intelligence nette et répondit aux questions qu'on lui addressait, quoique avec lenteur. Il avait une fièvre modérée, la langue blanchâtre et il n'accusait d'autres souffrances que des élancements à l'aine droite, où j'ai constaté la présence d'un boubon de la grosseur d'une noisette ; la peau de cette région était légèrement rouge. Sur la poitrine et sur le bras de ce malade il y avait des tâches noirâtres, véritables pétéchies, dont la grandeur variat entre celle d'un grain de millet et celle d'une lentille. La maladie avait commencé par une forte fièvre accompagnée de céphalalgie, de grande soif et de faiblesse dans les jambes. Le boubon et les pétéchies avaient apparu le second jour. De la femme je n'ai pu voir que la langue et le bras droit ; on m'a dit qu'elle était enceinte et qu'elle avait un boubon sous l'aiselle gauche. La langue était couverte d'un enduit blanchâtre, les lèvres étaient sèches, la fièvre forte, et j'ai remarqué sur le bras droit des pétéchies en grand nombre. La malade se plaignait d'une grande soif et d'une grande chaleur interne. L'enfant d'une assez bonne constitution, était couché sur le côté gauche, il était profondement assoupi, on n'est parvenu à le réveiller qu'en le secouant fortement et le mettant sur son séant. Deux boubons de forme oblongue comme deux petites amandes existaient aux régions inguinales depuis la veille, sans changement de couleur de la peau, et sur le ventre et au cou il avait des pétéchies rouges disséminées et pas en grande nombre. La fièvre et la soif étaient modérées.

" Dans le même quartier, à une centaine de pas de la première maison, nous sommes entrés dans une maisonnette de pauvre apparence. La, assize sous un petit vérandah, nous trouvâmes une vieille femme qui était malade depuis quatre ou cinq jours. Peu ou point de fièvre, pas de céphalalgie, un peu de diarrhée. Elle était gaie, nous dit avoir un boubon sous l'aiselle droite et nous fit voir quelques pétéchies noirâtres sur les bras.

" L'examen, très sommaire, je l'avoue, de ces quatre malades, sans me fixer d'une manière absolue sur la valeur de la maladie de Rescht, engendre dans mon esprit un fort soupçon qu'il s'agissait là très probablement de la véritable peste boubonique. M. le Dr. Iliine n'était pas de cet avis ; pour lui c'était une fièvre pernicieuse avec tendance aux inflammations des ganglions lymphatiques, se basant, disait-il, sur l'autorité de Greisinger et de Niemeyer, et sur cette conviction il a quitté Rescht le soir même.

" Le jour suivant, 28 Mai, j'ai fait prier Agha Saïd Djafer, médecin distingué de Rescht, et homme doué d'une intelligence non commune afin, d'obtenir de lui le plus grand nombre de renseignements sur la maladie que j'étais charge de définir. Il se rendit sans retard à mon invitation, accompagné de cinq autres médecins persans, et voici en résumé quels ont été ces renseignements. M. Latour, agent de la maison Ziegler, parlant et écrivant bien le Persan, a eu l'obligeance de me servir d'interprète. Dans le courant du mois de Mars il s'était manifesté dans le quartier de Djirkoutché, le plus bas, le plus sale et le plus pauvre quartier de la ville, une maladie caractérisée par une fièvre chaude avec des symptômes analogues à ceux du typhus et accompagnée de l'eruption de boubons aux régions inguinales, axillaires et cervicales et de pétéchies. Des vomissements bilieux, rarement sanguins, ouvraient souvent la scène de la maladie, et les boubons et les pétéchies ne tardaient pas à se produire tantôt dès le début et précédant la fièvre ; le plus souvent le second jour de la maladie, dans le cours de laquelle on observait des symptômes nerveux ataxiques (délire ou convulsions) ou adynamiques (prostration des forces et assoupissement), &c.

" Les malades étaient tourmentés par une soif inextinguible et se plaignaient de chaleur interne. Agha Saïd Djafer a observé un grand nombre de guérisons. Il a remarqué que la présence des pétéchies, surtout des pétéchies noires était de mauvaise augure, et que les boubons étaient au contraire un bon signe. Les malades mouraient d'ordinaire entre le troisième et le cinquième jour ; ceux qui pouvaient passer le septième guérissaient presque toujours.

" Les cas foudroyants n'ont pas manqué. Ainsi le nommé Mirza Akber, âgé de 27 ans, tombé malade avec fièvre et pétéchies autour des orbites, sur la poitrine et au dos, eut le troisième jour un boubon, mais il avait conservé encore assez de forces pour aller tout seul à la garderobe ; en se levant, pour rentrer dans sa chambre, il tombe roide mort. Le fils de Akber, qui était tombé malade avant son père, est guéri en sept jours. Dans les maisons où la maladie était entrée il était rare qu'on n'observait qu'un seul malade, d'ordinaire il y en avait deux, trois, et même davantage. D'apres Agha Saïd Djafer, la maladie resta confinée pendant deux mois dans les quartiers de Djirkoutché et

de Seylan, et de là, tantôt par contagion directe, quelquefois sans qu'on ait pu préciser le mode de propagation, elle envahit les autres quartiers.

" Voici les noms de ces quartiers d'après l'ordre d'apparition de la maladie : 1, Djirkoutché ; 2, Seylan ; 3, Ouctesserah ; 4, Comegran Kyal ; 5, Fahidan ; 6, Zebmeydan. Agha Saïd Djafer me déclara que lui ainsi que ses confrères avaient, dès la commencement, reconnu que la maladie de Rescht était la peste ; mais ayant remarqué qu'elle ne faisait pas beaucoup de victimes, et qu'elle n'avait pas une tendance bien marquée à se propager, ils n'en avaient rien dit à personne, pour ne pas effrayer la population. Le nombre des malades et des morts avait considérablement augmenté depuis le commencement de Mai ; il ne pouvait pas me dire d'une manière précise le chiffre des morts, mais il l'évaluait approximativement à 500. Il était enclin à attribuer cette maladie à l'hiver, qui a été excessivement doux, sans neige et sans glace, et à la fréquence extraordinaire des vents chauds.

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" Le 29 Mai, j'ai été appelé dans une maison sise à l'autre extrémité de la ville, quartier de Zebmeydan, non loin du Consulat Anglais, où j'ai eu l'occasion de voir quatre malades, dont j'ai pu recueillir soigneusement les histoires.

" C'étaient un jeune homme de dix-neuf ans, Aly Ekber, une jeune fille de dix-sept ans, Fatimé, un enfant de six ans, Meza, et une petite fille de quatre ans, Marie, tous frères et sœurs. Pour ne pas tomber dans des redites, et pour ne pas fatiguer votre attention, je me bornerai à vous faire la relation d'un de ces cas, qui est on ne peut plus caractéristique, en vous déclarant que, sauf quelques nuances de détails, tous les malades que j'ai visités présentaient tous la même physionomie spéciale.

" Aly Ekber, dix-neuf ans, de constitution lymphatique, mais n'ayant jamais été malade, en revenant le matin du 28 Mai du bazar, où il s'était rendu pour faire des emplettes, fut pris tout d'un coup d'une grande malais et eut trois vomissements bilieux accompagnés de forte céphalalgie et d'une telle faiblesse dans les jambes qu'il se traîna plutot qu'il ne marcha pour rentrer chez lui. Là, les vomissements se répétèrent et bientôt il se déclara une forte fièvre. La céphalalgie augmenta, une soif inextinguible et une sensation de chaleur à la région de l'estomac se produisirent et deux heures après deux boubons apparurent, l'un à la région inguinale droite, l'autre sous l'aiselle gauche. La faiblesse fit de tels progrès que le malade, pour aller à la garderobe, était obligé de se cramponner aux murs. Lorsque je l'ai vu le jour suivant, à 9 heures du matin, il gisait sous un vérandah à côté de son frère et de ses deux sœurs ; il présentait l'état suivant : decubitus dorsal, relâchement de tous les muscles, qui rendait le moindre mouvement excessivement pénible, apathie, physionomie hébétée, assoupissement dont on pouvait le tirer facilement, mais dans lequel il retombait à peine qu'on le laissait tranquille ; il répondait aux questions qu'on lui adressait avec lenteur mais raisonnablement ; dans la nuit il avait eu un peu de délire ; la respiration légèrement fréquente ; la peau de la poitrine, du cou et des bras parsemée de pétéchies noires dont la grosseur variait entre celle d'un grain de millet et celle d'une lentille ; j'en ai remarqué deux ou trois des plus larges sur le ventre, région d'ailleurs où des pétéchies étaient beaucoup plus rares.

" La température de la peau était très élevée, surtout au front et à la poitrine, malgré que ces deux parties fussent découvertes. La langue humide et blanchâtre, les lèvres sèches. Le malade demandait souvent à boire et se plaignait d'un feu intérieur ; il avait eu trois selles diarrhéiques dans la nuit, et un autre deux heures avant ma visite. Pour la dernière garderobe il n'avait pas eu la force de se lever de son lit ; le pouls était fréquent (98), large et dépressible. Les deux boubons présentaient la forme et la grandeur d'une noix, et la peau qui les recouvrait était rouge, le moindre attouchement provoquait des douleurs très vives. Les régions du foie et la rate ne décélaient à la palpitation ni à la percussion aucun changement dans le volume de ces viscères. Le malade urinait en proportion des liquides qu'il absorbait. J'ai jugé ce cas excessivement grave. Les trois autres frères du malade avaient été tous atteints à quelques heures de distance l'un de l'autre, et se trouvaient tous dans un état plus ou moins grave et présentaient des symptômes analogues. Tous ces malades sont morts entre le troisième et quatrième jour. Les soupçons que j'avais conçus sur la nature de l'épidémie de Rescht se changèrent en certitude après l'examen de ces quatre malades, et cette certitude ne fit que de s'accroître par les autres cas que j'ai vus et par les renseignements que j'ai pu me procurer. Il n'y avait pas de doute possible, c'était bien la peste d'Orient. Ou il faut rayer des ouvrages spéciales de pathologie tout ce que nous connaissons au sujet de la peste, et faire table rase de toutes les observations qui nous ont été transmises de la plus haute antiquité et des études sérieuses qu'ont été faites par les savants les plus compétents sur cette terrible maladie, ou il faut convenir que la maladie de Rescht est la véritable peste boubonique.

" Les faits sont là avec leur éloquence irrésistible, et les médecins vraiment dignes de ce nom n'hésiteront pas un instant à en reconnaître la signification et à se mettre d'accord pour conseiller aux Gouvernements intéressés l'application des mesures que l'expérience a démontrées efficaces contre les envahissements du redoutable fléau.

" Le typhus, la fièvre pernicieuse sous n'importe quelle forme, la fièvre récurrente ou autre, n'ont de commun avec la maladie qui règne à Rescht que des ressemblances banales. Ce qui caractérise d'une manière non équivoque la peste, c'est l'apparition des boubons, des pétéchies et des charbons dans le cours d'une fièvre très grave, c'est la marche rapide et promptement mortelle, c'est une expression particulière de la physionomie des malades qui ne peut pas être confondu avec celles des typhiques, ni des cholériques, et qu'il suffit d'avoir vu une seule fois pour ne plus l'oublier. Cette physionomie spéciale a fixé l'attention de tous les observateurs, qui l'ont décrite avec le plus grand soin. Les yeux sont retirés dans les orbites, mais ils ne sont pas cerclés d'azur comme les yeux des

cholériques, le regard est hagard, mais il n'a pas la fixité de celui des typhiques, les muscles de la face participent du relâchement des autres muscles et ne présentent pas les rides et les contractions des muscles des malades atteints de typhus ou des maladies cérébrales. L'expression de la figure des pestiférés est celle de l'apathie. Bref, la peste a une physionomie particulière et la démarche chancelante des pestiférés imprime à l'ensemble de leur attitude un cachet caractéristique. Eh bien, tels sont ces symptômes, la marche et la physionomie qu'on a pu observer dans la maladie de Rescht.

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"Si l'on me demande maintenant, d'où est-elle venue, cette maladie, ou en d'autres termes, a-t-on pu constater une importatien quelconque, je suis obligé de déclarer que toutes les recherches que j'ai faites à ce sujet n'ont abouti qu'à des résultats négatifs.

"Au dire des Mollahs, aucun habitant de Rescht n'est allé en pélerinage à Kerbéla, pour qu'on puisse soupçonner qu'en rentrant chez lui, apres avoir traversé la ville de Bagdad, il ait pu apporter la contagion dans le pays ; on assure en outre qu'aucune communication n'a eu lieu avec les pays pestiférés.

"Depuis la grande épidémie de peste qui en 1830 emporta la moitié de la population de Rescht, il n'y a eu dans cette ville, ni aux environs, aucune autre éclosion bien constatée de cette maladie. Cependant, je dois signaler un fait qui m'a été raconté par un empirique et qui tendrait à prouver que peut-être quelque manifestation pestilentielle n'a pas manqué à une époque moins reculée. En 1869, il y aurait eu à Rescht une épidémie de typhus qui aurait, d'après l'empirique en question, moissonné environ mille victimes. Parmi les malades de cette époque le dit empirique en aurait observé trois ou quatre, lesquels auraient présenté des boubons. En consultant mes souvenirs, je me rappelle qu'à cette époque feu le Colonel Hadayet, médecin alors au service du Gouvernement Persan, dans une conversation que j'ai eu au sujet des maladies épidémiques, me raconta qu'il avait vu lui-même dans le Ghilan de ce cas typhus accompagnés des boubons.

"D'un autre côté, il résulte des renseignements que M. Schulzewski, Chancelier du Consulat-Général de Russie à Tabris, lors de son passage par Téhéran venant de Bakou, m'a communiqué dans les premiers jours de Janvier, qu' à Bakou il y avait en quelques cas d'une maladie typhique avec boubons, et que dans deux maisons il y avait eu sept malades décédés, tous en trois jours. Parmi ces morts se trouvait aussi la mère de M. Schulzewsky. Je ne prétends tirer aucune conséquence de ces différents faits, lesquels ne peuvent prouver en définitive qu'une chose, c'est que dans ces pays il existe peut-être une prédisposition particulière à la production de la peste et que l'épidémie actuelle a trouvé tout préparés les éléments favorables à son évolution.

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"En attendant la fin de cette épidémie, après laquelle je présenterai un rapport général détaillé, je crois dès à présent pouvoir conclure que :—

1. La maladie de Rescht est bien la peste d'Orient.
2. Dans le commencement elle a eu une marche très lente.
3. La peste est restée pendant deux mois à l'état de maladie périodique.
4. Vers le commencement du mois de Mai, elle est sortie des quartiers qui l'ont vu naître, et a fini par envahir toute la ville.
5. Elle a déployé d'une manière évidente la propriété contagieuse.
6. On ne peut pas, pour le moment, dire quel a été le chiffre des attaques et celui des décès.

"Les symptômes, la marche, la physionomie spéciale de la maladie ne laissent plus dans mon esprit l'ombre d'une incertitude."

C.

PLAGUE IN RESHT, 1877.—*Report of Mirza Mehmet Hassan Khan to the Sanitary Council, Teheran, after* 50 *days sojourn* (*April, May, June*) *in Resht, and the observation of about* 50 *cases of the disease.*

"D'abord les malades éprouvaient de la fatigue, de la paresse, de la peur, la perte de l'appétit, de légères vomituritions, quelquefois même des vomissements. La langue se couvrait d'un enduit blanchâtre ou jaunâtre, et il y avait déjà de légères douleurs dans les points disposés à la naissance des boubons. Ces douleurs, qui augmentaient la peur des malades, quelquefois disparaissaient tout-à-fait et cet état prédominant durait d'un à trois jours. Ensuite les symptômes graves apparaissaient, mais non de cette gravité qui cause la mort en douze ou quatorze heures. Dans quelques cas même les symptômes étaient tellement légères que les malades d'eux-mêmes n'y faisaient aucune attention, si ce n'est à la douleur des aines des aiselles et rarement au-dessus de l'oreille. Dans ce cas il n'y avait pas de fièvre, les malades continuaient leurs occupations et après deux ou trois jours ils guérissaient. Mais dans les cas bien caractérisés, voici ce qu'on observait. D'abord de légères frissons, les malades éprouvaient le besoin de se coucher au soleil ou de se couvrir beaucoup quand ils étaient à l'ombre. Ce frisson durait d'une demi-heure à cinq ou six heures, et ensuite la fièvre revenait avec violence, quelquefois telle que j'ai vu quelques malades chez lesquels la fièvre ayant débuté le matin, dès le soir ils ne pouvaient déjà plus articuler les paroles. Toujours ils tiraient la langue et la voix était voilée et ils avaient beaucoup d'agitation. Ils indiquaient le cœur et l'abdomen comme siége d'une sensation de chaleur ou de douleur.

"Ils demandaient quelquefois à boire et n'avalaient cependant chaque fois que peu de boisson. Ne pouvant répondre aux questions, les malades ne pouvaient en conséquence nous faire savoir, s'ils avaient beaucoup de soif ou non. Un des malades avait la langue gonflée, large, sortant difficilement de la bouche ; ce malade avait une telle agitation qu'il ne pouvait rester une minute tranquille

dans son lit, il se tournait et se retournait sur lui avec la langue hors de bouche, et ne pouvant parler.

" Il faisait avec la main des signes pour porter notre attention à sa langue, à la région pectorale, à l'épigastre ; il ne se plaignait pas des régions où il avait des boubons. Les mêmes symptômes existaient sur plusieurs malades.

" En portant la main à l'aine ou à l'aiselle on sentaint une tumeur sans couleur de la peau, quelquefois très petite, quelquefois visible même à l'œil et alors douloureuse. Tous les malades qui au deuxième ou troisième jour présentaient sur le corps des taches rouges semblables aux piqures de puces, ou des taches plus grandes semblables au pourpre, mouraient infailliblement.

" Ce qu'il y a de mieux, c'est que chez la plupart des cas jusqu'à une heure avant la mort l'intelligence restait encore intacte et quelquefois ils nous priaient de les guérir en nous offrant tout leur avoir.

" Le nombre des boubons sur chaque maladie varie ; généralement, il n'y en avait qu'un à l'aine, quelquefois des deux côtés de l'aine il y en avait un ; j'en ai vu jusqu'à trois, l'un à l'aine, l'autre à l'aiselle, le troisième au bas de l'orielle. Ils étaient de la grosseur d'une pistache à celle d'un œuf de poule ; le plus souvent sans changement de couleur à la peau ; quelquefois ils étaient rouges, quelquefois violets, quelquefois avec ou sans douleur. Quelquefois ces boubons paraissaient avant la naissance de la fièvre, d'autrefois dix à douze heures après son début ; quelquefois ils suppuraient, jamais j'en ai vu d'ouverts spontanément, ils avaient besoin de la lancette.

" Le jus avait la couleur ordinaire du pus des abscès ; dans chaque maison où la maladie paraissait il y avait au moins deux ou trois malades ; dans la maison de Merye Ismaïl Jalveldor, sept personnes sont mortes en huit jours. Les autres habitants s'enfuirent. Les sept personnes moururent, bien entendu, toutes de la peste boubonique. Chez quelques malades après le fièvre la vomissement parait quelquefois fort, quelquefois faible. J'en ai vu qui vomissaient en vingt-quatre heures jusqu'à trente fois. Un de mes amis avait quitté Rescht avec moi, il était déjà atteint, il mourut à six lieues de la ville, il vomissait nuit et jour. Les vomissements sont de couleur différente ; quelquefois c'est un liquide nagueux et filant ou jaunâtre ou verdâtre. J'ai noté aussi les symptômes généraux qu'on observe dans la plupart des fièvres épidémiques. La céphalalgie, la rougeur du visage, des yeux, la blancheur et la sécheresse de la langue, les nausées et quelquefois les vomissements, les douleurs légères dans les membres, l'anorexie, la soif, une grande prostration, les pétéchies qui paraissaient du deuxième au troisième jour. La sueur s'observait le plus souvent, mais c'était une sueur d'affaiblissement et non une sueur critique. Au commencement on pouvait croire que c'était une fièvre intermittente, mais après avoir reconnu les boubons, nous n'avions plus de doute.

" J'ai entendu parler de quelques personnes qui douze heures après la fièvre étaient mortes sans pétéchies et sans boubons, et j'en ai vu beaucoup et j'ai entendu parler de beaucoup de malades de mes confrères qui après la fièvre et les boubons avaient guéri."

D.

PLAGUE IN RESHT, 1877.—*Extracts from a Report by Dr. Kousminsky (?), Physician to the Russian Legation, Teheran.*

[Dr. Kousminsky arrived in Resht on the 16th May 1877 for the purpose of making inquiry concerning the nature of the disease which had shown itself there and was rumoured to be plague.]

" 1. Dans la maison de Kerbalaï Skender est tombée le 8 Mai une fille, nommée Marya, âgée de cinq ans. Marya est d'une constitution forte, elle a le teint pâle, l'expression d'abattement, la figure cadavérique, elle a la force de marcher, le cou est court et courbé, la tête inclinée vers le côté gauche ; sur le côté gauche du cou (*Phigonum supra claviculare sinistrum*) se présente une enflure de la grosseur d'une petite pomme, d'une forme ronde, de couleur pourprée tiranté sur le bleu. Cette enflure est proéminente et avait été transpercée la veille par un séton dont l'ouverture laissait couler une matière inodore grisâtre. Au-dessus de cette ouverture on en remarquait six ou huit autres qui s'étaient fermées d'elles-mêmes et donnaient à l'ensemble de la tumeur un aspect criblé. Au fond de ces ouvertures on voyait le tissus cellulaire blanc ; la forme de la tumeur était celle d'un charbon ou anthrax. Il résulte des renseignements fournis par la famille que cette tumeur a paru huit jours auparavant, accompagnée d'une très forte fièvre qui se renouvela à plusieurs reprises et cessa la veille de mon arrivée.

" Six jours avant de tomber malade la petite Marya allait voir souvent une cousine souffrant du même mal ; à ce qu'il paraît c'est là qu'elle l'a contracté. Dans la même maison se trouvent le père, la mère et trois autres petits enfants, tous encore bien portats. La maison est bâtie sur un terrain végétal humide, tout près de la rue, elle est entourée de ruisseaux remplis d'eau sale et puante, mêlée aux immondices des égouts. A dix pas de cette maison se trouve un cimetière, et l'atmosphère des chambres et de la cour est étouffante et puante.

" L'aspect de la maison voisine est le même ; on considère Marya comme convalescente et hors de danger

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" 4. Dans le quartier de Djirkoutché, où se manifeste la maladie, se trouvent de pauvres huttes bâties sur un terrain humide et entouré d'une enceinte de roseaux et d'arbres. Dans une de ces huttes habitaient deux individus, mari et femme, tous deux malades et sans aucun secours. L'homme

s'appelait Hussein. D'une constitution forte, âgé de vingt-cinq à vingt-sept ans, il est tombé malade depuis quatre jours. Quoique très faible, il a encore assez de force pour soulever la tête, mais il se sent comme dans un état d'ivresse. Sous l'aiselle gauche il a une tumeur qu'on ne distingue pas à la vue, mais qu'on sent au toucher.

" La peau qui recouvre la tumeur n'a subi aucun changement. Le mal a commencé par un forte fièvre accompagnée de chaleur brulante, délire, soif insupportable ; la tumeur se ferma le second jour et depuis lors tous les symptômes ne firent que s'aggraver. Pas d'eruption sur le corps.

" 5. A trois pas de Hussein était couchée sa femme, âgée de trente ans ; elle était sans connaissance et avait du délire. Cette femme portait aussi une tumeur à l'aiselle droite, dont la forme et la grandeur peuvent être comparées à la forme et à la grandeur d'une mamelle d'une fille de treize ans. La peau couvrant cette enorme tumeur ne présentait aucune altération. Malgré l'état du délire où elle se trouve, elle pousse des cris lorsqu'on touche à la tumeur. La prostration est extrême, les yeux brillants, la pupille contractée. On remarque à la région antérieure de l'avant-bras gauche des lignes bleuâtres qui donnent à cette région une apparence mabrée ; l'état de cette malade est désespéré.

" D'après le dire de son mari, qui peut encore parler, ils sont tombés malades tous les deux après la mort de leur fille, âgée de quatre ans, succombée à la même maladie. Dans la seconde hutte étaient couchés trois individus, mais on ne me les laissait pas voir, en disant qu'ils dormaient sans être malades ; je doute fort qu'à cette heure-ci les Persans passent la sieste.

" 6. Dans le quartier Soumah Bedjar, dans la maison de Kumirou Zeidan, un homme est couché malade, nommé Melik Mehmet, âgé de seize à dix-huit ans, d'une constitution forte, de profession brodeur en soie ; il est au lit depuis trois jours. D'après les renseignements donnés par sa mère, Melik Mehmet a été pris de la maladie avec grande faiblesse, il se couchait et bientôt se levait, il perdit l'appétit et était dans un état d'inquiétude continuel. Le 14 Mai, après un accès de fièvre, il se mit au lit et bientôt il fut saisi d'une forte chaleur et de délire. De temps en temps il se plaignait d'un fort mal de tête. Depuis hier il a perdu le sommeil, il sort continuellement de son lit et se promène en délirant. La chaleur et la soif ont augmenté.

" Aujourd'hui, 17 Mai, il se sent un peu mieux, mais en revanche il se plaint d'une douleur à l'aine gauche, où j'ai découvert une tumeur de la forme et grandeur d'une amande, sans altération de la peau.

" Cette tumeur, qui est résistante et dure, est la siége de douleurs aigues qui se produisent au plus léger attouchement. Malgré le délire, le malade crie et se démène. La peau de tout le corps est chaude et sèche, mais à la région inguinale gauche elle est brûlante. Le pouls est plein et donne 120 pulsations à la minute. La langue est sèche et couverte d'un enduit blanchâtre, les yeux sont brillants, les pupilles légèrement contractées. Il y a deux jours que le corps est couvert d'une éruption ressemblante à des piqures d'épingles et d'une couleur d'ardoise ; cette éruption ne disparaît pas sous la pression des doigts.

" Les Persans appellent cette éruption " aspeh," et elle a l'apparence des pétéchies.

" Le malade urine six fois dans les vingt-quatre heures, mais par de petites quantités ; l'urine en est jaunâtre ; pas de garderobes si ce n'est provoqué par des lavements. Anervie complète ; il est à jeun depuis cinq jours ; Melik Mehmet se plaint de cephalatapie, d'oppression de respiration et, pour me servir de la phrase, d'une " inquiétude de cœur."

" Non seulement il ne peut pas sorter de son lit, mais il n'a pas même assez de force pour soulever sa tête ; pendant le délire, il marchait de temps en temps dans sa chambre en chancelant.

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" 8. Dans le quartier de Djirkoutché, dans la maison appartenant à Kerbelai Mirza, j'ai vu le nommé Ahmet, âgé de vingt-huit à trente ans, d'un constitution très forte, boulanger de son état. Au milieu de la cour il y a un puits couvert de plantes aquatiques, à huit pas de ce puits se trouve l'égout.

" Il y a deux jours que Mirza Ahmet est tombé malade d'une fièvre avec grande chaleur et soif. Aujourd'hui tout son corps est couvert de pétéchies sous forme de piqures d'épingles de couleur ardoise, lesquelles ne disparaissent pas sous la pression des doigts. Le malade est en délire, il se démène continuellement sans avoir une minute de repos. Le regard est terne, les yeux brillants, la pupille légèrement contractée, la langue blanche et humide ; en montrant la langue, il ne retire pas avant qu'on ne le lui dise ; la figure est rouge, sur tout aux pommettes, la peau est brûlante et sèche, le pouls à cent pulsations, l'urine est rare ; dans l'aine gauche se trouve une tumeur de forme plate, de la grandeur d'une noix, très douloureuse à la pression ; le moindre attouchement arrache des cris au malade, malgré la perte de connaissance.

" Mirza Ahmet n'était pas en état de répondre à mes questions ; sa mère me raconta que dans les maisons voisines il y avait eu des individus atteints de la même maladie, et que plusieurs en étaient morts. Mirza Ahmet visitait ces maisons et en recevait des visites. Ce malade est en grand danger ; je considère même son état comme désespéré.

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" M. le Dr. Kousminsky conclut de ces observations que la maladie de Rescht n'est autre chose que la peste boubonique."

E.

MÁHÁMARI IN KUMAUN, 1876–77.—*Extracts from the Ninth Annual Report of the Sanitary Commissioner of the North-Western Provinces.* (*Mr. C. Planck.*)

"The symptoms and character of the disease under consideration (Máhámari) coincide very exactly with the description thus provided of plague, with the exception that the appearance of petechiæ (purple spots) on the skin has not been noticed in the Kumaun form of the disease. No appearance of that nature could be seen on the skin of the sick persons examined, and no evidence of such appearance in any case could be obtained. It is likely that this absence of visible petechiæ may be due to the fact that the people affected were all dark skinned.

"But this absence of one comparatively unimportant symptom can have little weight as against the overwhelming evidence of the histories, favouring the opinion that the disease is plague, perhaps modified, in some respects, from the plague of Egypt and the Levant, by reason of difference of climate and race, but essentially the same disease, and distinguishable only under that name.

"When first brought into contact with the disease, I was inclined to think, as Dr. Rennie had done, that it was a form of rapidly fatal typhus, more especially as the characteristic buboes of plague had not, as described to me, been observed in the cases first brought under my notice at Bált and Bintola. A further acquaintance with the disease, its symptoms and peculiarities, soon convinced me that it was identical with the disease *pestis* of medical writers, and nameable in English only as *plague*.

"The symptoms of this Kumaun plague, and the course of the disease, as learnt at this investigation are as follows:—The attack is preceded by an unmistakable appearance of lassitude and anxiety . . . . Usually the first symptom of actual disease is shivering, followed by intense fever. The symptoms of fever, rapid pulse and hot skin, continuing after about 12 hours pain in the head, will have become a prominent symptom. The head will be hot, the brain evidently congested. The pain continuing, by the evening of the second day the sufferer will be delirious. The delirium may be passive, the patient complaining of imaginary noises which disturb him; for example, he may frequently complain of some person chopping wood or grinding corn near the house, when all is silent there; or it may be active, the patient starting up and running out of the house, as in the case of a mother who was said to have run away in her delirium. By the evening of the third day the patient will be insensible, and will die during that night.

"This is the course of the disease in by far the greatest number of cases, and in these frequent cases of death on the third day no characteristic appearance of plague disease will be found on the body after death.

"But there are two well-marked exceptions to this general course of the disease:—

"First the case in which the vital principle is overpowered at once by the violence of the disease, and in which the patient will die within 24 hours of first attack.

"Second, the case in which, after the delirium or insensibility has continued for some hours, glandular enlargements appear either in the groin, armpit, or neck. These may appear as early as the fourth day . . . or they may not be prominently apparent until as late as the 17th day. . . . . [In a case, however, where the bubo was not observed until the 17th day] I have reason to think that the bubo in the groin had commenced to form before the 17th day, although its presence was denied until that day. And the balance of evidence is greatly in favour of the opinion that the appearance of these glandular enlargements marks a favourable crisis in the disease. Besides these critical glandular swellings, other boil or carbuncle like swellings, not glandular may appear . . . and with the appearance of these glandular and other critical swellings a faint hope of recovery may be entertained, the ultimate favourable result appearing to depend greatly upon the favourable progress of the swellings towards suppuration and the discharge of matter from them. For many cases end unfavourably on the fourth, fifth, and sixth days, after the swellings have commenced to appear, but of 14 cases of recovery which came under my notice, in 10 the recovery was not perfected until after the critical swellings had suppurated and discharged their contents. This certainly advantageous result of suppuration not being, however, absolutely essential to recovery, as shown in [the other cases].

"The dangerous character of the disease and its extreme fatality are forcibly shown by the results recorded in the histories of the 40 villages affected in this latest period of prevalence during 1876–77. In these 40 villages the total number of cases which occurred was 291, and of these 291 persons 14 recovered and 277 died. That is to say, that of every 100 cases 95 terminated in death; an untoward result sufficient of itself to stamp the disease as something more urgent than that known as typhus fever.

"The history of this plague of Garhwál and Kumaun as yet recorded shows it to be the result of endemic influence, arising from conditions or agencies peculiar to a locality. The specific poison of the disease has doubtless been constantly extant somewhere in the world for many generations past, and very probably extant for many generations past in Garhwál and Kumaun. The previously recorded account of its supposed commencement at Kidarnath, in 1823, can be of value only as an expression of opinion, recounting the belief of the existing generation, amongst a people who have no records or knowledge of previous generations. The fact that the people everywhere in Kumaun and Garhwál have a specific name for the disease, calling it "Gola" or "Phutkia," both words meaning bubo, not only adds strength to the belief that the disease must be plague, but favours the probability that the disease was known to previous generations. The term Máhámari (pestilence) was not understood by the country people as applied to this disease especially, cholera also being called Máhámari.

"Nothing as yet recorded tends to show that the disease has ever been epidemic, that is, tending to spread rapidly so as to destroy great numbers of people. During the prevalence of 1834–35 a total of 633 deaths were recorded as having happened in villages widely separated in Garhwál, the greatest number of deaths in one village having been 47. During the prevalence of 1849–50 a total of 113 deaths were recorded in nine villages. During the prevalence of 1851–52 I find by a statement in Dr. Pearson's Journal that 567 deaths were recorded in 77 villages.

"During the prevalence in 1860 about 1,000 persons are said to have died of the disease, but there is nothing on record showing the number of villages affected.

"During the prevalence of 1876–77, which forms the subject of this Report, 41 villages in all were affected in Kumaun. Of these I have recorded the history of local prevalence in 40, the remaining village being Nágar on the borders of Garhwál, near Ganái, where Dr. Watson made local inquiry, and has informed me that about 10 deaths had occurred amongst the Dom community of the village. In the 40 villages of certain record 277 deaths occurred. These villages are widely separated in different parts of Kumaun, so widely that they may be fairly considered as scattered throughout its northern half. The district contains a total of 6,346 villages, inhabited by people, with but few exceptions, identical in race, habits, and peculiarities of life. Yet the disease has, on no occasion of its prevalence, so far as I can learn, shown a tendency to prevail in any great number of villages with contiguous lands, and certainly in this last time of prevalence nothing of that epidemic tendency existed.

"This absence of epidemic tendency would appear to exclude any supposition that the prevalence of the disease may be due to any cause affecting things enjoyed in common by the people, such as the air they breathe, or the food they eat, or from any peculiarity in their common habits. And the inquiry becomes narrowed to a consideration of the local condition or peculiarities of the centres of population in which the disease is seen to prevail.

"As touching this endemic peculiarity of the disease shown by the scattered geographical position of the villages affected, many villages unaffected intervening, a study of the histories, previously recorded, will add strength to that opinion. For it will be seen that, as a rule, the prevalence, even in the village itself, is confined to one house, or one terrace, or one portion of the village.

"This peculiarity is plainly shown in the rough ground plans which accompany the histories. Isolated cases may occur amongst families inhabiting other portions of the village, but commencing and excessive mortality appears, almost invariably, to be restricted in locality as described. And where not so restricted, a means, other than that first operating, may be clearly traced to account for the peculiarity.

"This means is the communication of the disease from person to person, against which the strongest and best health is no guarantee, although probably debility of body conduces to an attack by this means. I use the term 'means' in preference to 'cause,' because the cause, whether in the first or last case of the local prevalence, is the same, namely the specific germ or active principle of plague which can only produce plague disease; the disease being plague, it is hardly necessary to dwell upon the fact that it is communicable from the sick to the healthy; for, of all diseases, plague possesses that peculiarity in most marked degree. This opinion rests on the record of many facts, the principal of which are the death from plague of 80 medical officers of the French, and of half of the medical officers of the English army during the campaign in Egypt; and the death, with hardly an exception, of some few persons who have inoculated themselves with plague matter.

"The histories of this record provide ample evidence of the communicability of the Kumaun plague . . . These histories everywhere provide an account of a disease, not suddenly arising many cases together, but occurring, as a rule, in orderly succession of cases amongst those who lived habitually together, nursed the sick, and buried the dead. Indeed I think the histories support the opinion, that, ordinarily, the first case occurring in a village gives origin to all that succeed in that neighbourhood.

"The history of the outbreak in the Balt and Bintola group of villages is as follows:—First, in Balt, a young child is taken with the disease, it spreads in the family, and amongst those who nursed the sick only. A woman of Bintola attends as a nurse; she is the first taken ill in Bintola and the disease spreads in her family and terrace only. A boy from Sirar stays one night in an infected house at Balt, the disease commences in his family, and he is the second to die in Sirar. A man from Biraura visits an infected house in Bintola; he is the first to die in Biraura, and the disease spreads only in his terrace amongst those who nurse him. A woman of Gajula lodges for one night an infected woman of Galt who dies shortly afterwards. Only the one woman of Gajula died in that village. A woman of Sulla visits Bintola to inquire as to her daughter's welfare in this time of trouble; the disease breaks out only in this woman's family.

"The peculiarity of the commencement of a local prevalence with the death of a woman or child is sufficiently often recorded in the histories to make it seem likely that that is the ordinary rule in cases in which the disease breaks out without clear history of communication of the disease from the sick to the healthy. On the other hand, it seems likely, whenever the first person to die is a strong man, that then the disease has been introduced from without, as in the case of Biraura, Baunri, and Álam.

"If this view is correct, and I think the histories uphold it, the inference is plain that there is something in the lives of the people which brings women and children, more readily than men, into such a state of health as befits the reproduction of this old disease.

"The evidence in support of the belief that the germs or active principle of plague are likely to be wide-spread over Garhwál and Kumaun is unfortunately only too clear. Since 1823 the death of 3,600 persons from this disease have been officially recorded. Without doubt the deaths have been

far more numerous, and the bodies of all those who have died have, with few exceptions, been buried within or near to the site of the affected village. The custom of the country with regard to the disposal of the dead is to burn the body beside the most convenient mountain stream terminating in the Ganges. But from this good practice the people have deviated in regard to bodies dead of any pestilence, small-pox, cholera, plague, which are buried. Of all countries the Himalaya is least suited to the burial of the dead. For, by reason of the rocky sub-soil, it is seldom possible to dig a grave more than two feet deep; and, as a rule, the pestilent dead are lain in shallow trenches in the surface soil of the field nearest to the place of death, or of the terrace facing the house, or even of the floor of the house itself. This bad practice is begotten of fear, no doubt, but has been long established as a custom handed down from previous generations, and cannot easily be changed.

"Fear of taking the pestilence strengthens the desire to dispose of the body with the least possible amount of handling, and it is pushed into the trench and covered up. But sometimes, with regard to plague, fear masters all other feelings, and the body is abandoned unburied to be eventually drawn in portions about the village site by animals and birds. Such management of the dead is sufficient to account for the continuous existence of the active principle of plague disease, sometimes dormant from want of opportunity, but ever ready to affect persons suitably prepared, by any cause producing a low or bad state of health. The only apparent cause likely to produce such a state of health in any member of a family affected in the outbreaks described in the histories is the unwholesome condition of the houses, by reason of their being utilised for three purposes, namely, as habitations, as granaries, and as cowsheds. The result being a vitiated state of atmosphere in and around the habitations certainly conducive to ill-health amongst the residents, and more especially amongst the women and children of the house who would be more continuously influenced. This utilisation of the house for three purposes, while it should, on strict sanitary principles, be reserved for one, would be likely, even with the best possible management, to be a cause of disease. For it has, I believe, been conclusively shown that the habitation of cavalry soldiers above their well-kept stables has been conducive to contagious fever amongst the men.

"But with the bad management of the ignorant or careless Kumaun peasant, the result must be detrimental. His autumn grain, partly unripe in unfavourable seasons, and always damp . . . is stored about the sleeping apartment, in open porous vessels or baskets, to slowly ripen and dry; a process often attended with some amount of fermentation, resulting in the production of gases which vitiate the air of the close room. The lower portion of his house and its immediate precincts for many months of the year, are much encumbered with manure. The exhalations from the cattle rise into the sleeping apartment, their fluid excretions sink into the ground below the house.

"These unwholesome conditions within and around the habitations would assuredly conduce to outbreaks of contagious fever amongst the residents in any country. That in Garhwál and Kumaun they conduce to outbreaks of plague disease is due to the fact that the germs or active principle of that disease are in wide-spread existence throughout that country. These same insanitary conditions do in some instances conduce to the prevalence of a form of contagious fever called "sanjar" by the people. This sanjar may be something less formidable and fatal than plague, certainly it is less feared than plague, but it is often fatal after a very few days' illness, the deaths mostly occurring amongst the members of one family in a village. And from the character and general result, as described to me of this sanjar disease, I think it also may be plague, ending in death before the characteristic swellings appear.

"Taking sanjar and plague together it would appear that contagious disease ending in speedy death is a pretty common form of disease at all times present somewhere or other amongst the villages of Garhwál and Kumaun. And I do not see how this can be prevented, so long as the homes of the people are mismanaged as described. For a time there may be a lull in the prevalence of these fatal contagious diseases, but so long as the conditions conducive to a general bad state of health remain unchanged there will be danger of fresh outbreak commencing, probably in some very old and much neglected tenement. This tendency to commencement of the disease in a house of great age is shown [in several of the histories].

"Excepting inasmuch as any bad quality of the grain commonly consumed by the people may conduce to a low state of health, I do not think the prevalence of plague disease can be due to any peculiar condition of this or any other article of food. At the same time I should say that Dr. Watson, a careful observer, is of opinion that the prevalence of plague in Garhwál and Kumaun may be due to the generation of a fungus in decaying grain. [Dr. Watson's statement and arguments are given in a paper headed "General Remarks on Máhámari," which is appended to Mr. Planck's report].

"It is undoubtedly true that rats are sometimes found dead in the houses of families about to suffer from an outbreak of plague. I have seen several of these dead rats in and about infected houses. They are not the strong black Norway rat which lives in the sewers of Europe, but a more delicate looking grey species. All I have seen appeared to have died suddenly, as by suffocation, their bodies being in good condition, a piece of rag sometimes clenched in the teeth; and I think it likely that they may have died from the same cause of vitiated atmosphere as produces the bad state of health conducive to attack of plague in man. The best record of this death of rats will be found in the Bintola history, and it may be noticed that the dead rats were described as being found in the morning on the floor near to the sleeping people. It seems probable that their ordinary places of exit may have been closed. If dying of poisonous grain I should think they would be likely to die in their holes or hiding places. I have seen some live snakes near to infected villages, and one particularly live snake which came out of an infected house; but I have never

seen any dead snake in connexion with an infected house or village. If snakes die from eating the deceased rats, cats could hardly be expected to escape. Yet far from seeing any dead cats, I have on several occasions had some trouble in saving the life of a cat desperately attached to an infected house about to be burnt.

[" The villages in which the death of rats in the infected houses was testified to were Bintola, Chani, Kansani, Khajuli, Tailihat, East Dugora, Parsali, Sungarh, and Naukori, and in all these places the history points to an outbreak of plague disease not resulting from infection. They seem to be places in which the disease renewed its active appearance; and, as the result of careful inquiry and observation, I think it may be true that the death of rats, preceding an outbreak of the disease, points to certain local conditions or peculiarities as giving rise to the outbreak. In no village, where the history clearly points to infection as the cause of the outbreak could I obtain evidence of the death of rats, and I think it may be true that where rats have not died infection has given rise to the outbreak, p. 94.]

" I have on several occasions recorded the fact that the people of an infected house, when vacating it for a jungle residence, took with them a supply of the grain they had been eating for many previous days, lived on it in the jungle, and suffered no harm. Indeed that is the usual course of proceeding and frequent result (pp. 87–92)."

FURTHER APPENDIX, FEBRUARY 1879.

F.

ON THE CHARACTERS OF EPIDEMIC PLAGUE IN MESOPOTAMIA IN 1876–77.—*By E. D. Dickson, M.D., Physician to the British Embassy, Constantinople.* A PAPER COMMUNICATED TO THE LOCAL GOVERNMENT BOARD BY THE EPIDEMIOLOGICAL SOCIETY OF LONDON, FEBRUARY, 1879.

The sudden and alarming announcement of an outbreak of plague in Asiatic Russia, the possibility of this scourge extending into Europe; the conflicting opinions that seem to be entertained concerning the nature of the malady and the precautions necessary to ward it off, have prompted the following brief sketch, derived almost entirely from notes taken, and kindly given me, by Dr. Giovanni Cabiadis, as the result of his observations at Hillah and Bagdad, during the outbreaks of plague in 1876–77.

History.—Two or three months previous to the manifestation of plague in Mesopotamia *glandular swellings free from fever* prevailed in that country. They showed themselves in the groin, armpit, or neck, and were not accompanied by other symptoms. They began to appear amongst the inhabitants about the end of autumn, and continued through the winter; but towards the end of it plague broke out and reached its acme of intensity in the spring, and died out suddenly during the summer season when the *great heat* declared itself, and the thermometer rose to 45 or 50 degrees of centigrade scale (113° or 122° F.). During the prevalence of the plague the thermometer ranged between 5 and 30 degrees; and when it rose to 30° (86° F.) the disease had reached its maximum of intensity. As the temperature increased from 30° to 45° (86° to 113° F.) the epidemic began to diminish, and as soon as the thermometer got up to 45° (113° F.) it ceased abruptly. On the cessation of plague *apyretic glandular swellings* reappeared again, precisely similar to those which had preceded the outbreak, and they continued to manifest themselves for about two months longer. These glandular swellings were frequently met with, and were distinct from the chronic adenitic swellings met with in subjects of a scrofulous tendency, and evidently unconnected with any special diathesis.

Symptoms.—The symptoms that characterise plague are of two orders, local and general. In severe cases the general symptoms precede the local manifestations. The patient is suddenly seized with high fever, which, in some instances, is ushered in by a prolonged shivering fit, the pulse beats 130, or even more, and the temperature of the body rises to above 42° (107·6° F.) centigrade. In some cases, however, this febrile condition is hardly appreciable, while on the other hand alarming complications indicate the severity of the attack by perturbations connected with the nervous centres, such as convulsive tremor, drowsiness, coma, delirium; or with the circulating system, such as epistaxis, hæmatemesis, hæmoptysis, sanguineous diarrhœa, menorrhagia; or with the assimilative organs, such as painful tumefaction of the liver, bilious vomiting, bilious diarrhœa, jaundice, &c, These phenomena appeared to be dependent on some *periodic impulse*, because at times the biliogastric manifestations prevailed; at others the hæmorrhagic, and at others the nervous. The nervous agitation which sometimes ushers in an attack of plague is a very remarkable symptom, and one that Dr. Cabiadis had never met with before. He describes it as a *prolonged regular shake* lasting from six hours to three days. While the patient is suffering from it he does not complain of cold, nor does the thermometer indicate a lowered temperature. The pulse is small, short, and quick, and the temperature of the body remains in nearly its normal state. This tremor is always followed by profound coma, during which the patient rapidly sinks.

In some instances of plague Dr. Cabiadis has seen death supervene within a few hours of the attack, and before any of the characteristic indications of the disease, such as buboes and carbuncles, had shown themselves. These severe cases were mostly met with at the *commencement* and at the *termination* of an epidemic outbreak.* They were observed in the plague of 1876 at Hillah, as well as in that of 1877 at Bagdad; and in these instances the glandular swellings either did not appear at all, or were very small and never suppurated; the patient, moreover, seldom lived more

* I have noted a similar circumstance in severe epidemic outbreaks of *cholera*. The first and the last attacks were mostly *fatal*.

than three days. The cutaneous surface, in some cases, was so filled with *petechiæ* that, when death supervened the skin assumed a dark livid hue, giving the corpse a *blackened appearance*, and so characteristic of the malady that it might even to this day be called the *black death*.

In the usual course of plague, however, the local manifestations precede the general symptoms. The patient first complains of pain in the groin, the armpit, or the neck, and on examining the part a swelling is found there, which rapidly increases and usually suppurates by the seventh or eighth day; at the same time carbuncles may show themselves, and in bad cases petechiæ. In these instances the fever runs high and in accordance with the gravity of the case. When *death* supervenes it mostly occurs on the fourth or fifth day of the illness; but three-fourths of such patients are reckoned by Dr. Cabiadis to get well.

In slight attacks of plague the local manifestations are seldom accompanied with *fever*, and you often meet such patients walking about the streets, with two or three suppurating buboes upon them. These cases are hardly ever fatal.

I have expressly omitted, in the foregoing description, to mention several symptoms which are usually met with in all febrile complaints, in order to draw attention to those which may be considered as pathognomonic of the plague. Headache, thirst, constipated bowels, lassitude, and aches in the limbs exist, more or less, in all fevers. The appearance of the tongue in cases of plague is not in general much altered; usually, it is red at the tip and edges and sometimes dry. A comatose state is much more frequently met with than a delirious one. The diarrhœa is always either sanguineous or bilious, but never *serous*. As a rule an attack of plague lasts from a few hours to four weeks, and Dr. Cabiadis considers that one-third of the attacks end fatally. From the accompanying table, however, of 1826, cases of plague seen and registered by him at Hillah in 1876, the proportion of deaths to that of the attacks is 52·6 per cent. But a great many cases of plague, he observes, are never made known, and would thus diminish very considerably this per-centage of its mortality, whilst the deaths, on the other hand, must all be reported, in order to obtain the permit of interment.*

ANALYTICAL STATEMENT of 1,826 cases of Plague noted by Dr. Cabiadis, at Hillah, during the Epidemic of 1876.

Age.		Sex.		Result.	
From 2 months to 9 years	277				
„ 10 years „ 19 „	617				
„ 20 „ „ 29 „	432				
„ 30 „ „ 39 „	292	Male	889	Got well	865
„ 40 „ „ 49 „	123				
„ 50 „ „ 59 „	52	Female	937	Died	961
„ 60 „ „ 69 „	18				
„ 70 „ „ 79 „	11				
„ 80 „ „ 89 „	3				
An old man of 113	1				
Total	1,826		1,826		1,826

Manifestations:—

Glandular swellings—			
	in the groin	710	
	„ axilla	466	
	„ neck	98	
	„ several places	122	
		1,396	
Carbuncles		36	
Dependent on the nervous centres	Coma	28	
	Convulsive shake	9	
„ circulating system	Petechiæ	120	
	Epistaxis	2	
	Hœmoptysis	6	
	Hœmatemesis	27	
	Sanguineous diarrhœa	14	
	Menorrhagia	2	
„ assimilative organs	Bilious vomiting	32	
	Bilious diarrhœa	16	
	Jaundice	2	

Diagnosis.—The diagnosis of plague is not difficult, for no other malady presents an assemblage of symptoms so well-marked and so significant of its true nature. In fact, no other idiopathic fever, attacking a multitude of persons at the same time, is characterised by glandular swellings, by

* The same remark applies to the death-rate shown by the official register kept at Bagdad in 1876, and which gives 55·7 as the per-centage of deaths to that of the attacks.

carbuncles, and by those severe manifestations of the nervous, sanguineous, and bilious systems which declare themselves in an attack of the *plague*.

Dr. Beck, and a few other physicians, basing their views on the intercurrent phenomena manifested in some cases of plague, imagined that this disease might be merely a variety of the *pernicious fevers* engendered by the *malaria poison*; but Dr. Cabiadis cites three facts, which conclusively subvert this hypothesis.

1. No *intermission* has ever been observed in the symptoms of plague, not even in those intercurrent phenomena which arise from complications of the nervous, circulating, and assimilative organs.

2. There is no instance on record of an attack of plague having been *cut short by the administration of sulphate of quinine*.

3. The striking difference which marks the *expression of the countenance* and the *general aspect* presented by a person suffering from an attack of *pernicious fever*, and those of one suffering from the *plague*. On coming up to a patient suffering from an attack of pernicious fever you are struck with the gravity of his case and the danger threatening his life. The very reverse of this meets your eye when you see, for the first time, a case of plague. Even the worst instances of this malady are apt to deceive an *inexperienced* physician, and make him fancy that the case is free from danger, when in reality the patient has only a few hours to live. The first instance of plague seen by Dr. Cabiadis did not seem to him to be one of an alarming nature. The patient looked stupefied, or rather as if intoxicated, and did not answer readily the questions put to him. He had vomited blood, and had a very small bubo in the right axilla, but the pulse and temperature were normal. This patient *died a few hours after Dr. Cabiadis' visit*.

Prognosis.—Rapid suppuration of the buboes, even when accompanied with *high fever*, indicates a favourable termination.

All cases complicated with nervous, hœmorrhagic, or bilious manifestations, end fatally.

Contagion.—With regard to the debated question of *contagion*, I beg to draw attention to the conclusions arrived at by Dr. Cabiadis, and which are derived from a careful study of the facts that came under his observation during the two last outbreaks of plague in Mesopotamia.

Dr. Cabiadis neither attempts to deny the contagious properties of plague, nor does he accept unconditionally the assertion of those who pretend that you must keep at a distance, say of six metres from the patient, in order to avoid contracting the disease. The experience acquired by him during the epidemic outbreaks of Hillah and Bagdad has convinced him that no great risk is incurred *in touching persons affected with the plague*, provided you avoid exposing yourself for any lengthened period to the atmosphere of the apartment occupied by him. As a proof of this doctrine, he says that those persons who lived in the same house with a plague-smitten patient, but who avoided touching him or his clothes, through fear of catching the infection, generally did get the plague; whilst those who lived in houses exempt from the malady, but who visited plague patients and handled them freely, without remaining long in the same room with them, hardly ever caught the disease. When plague entered a house it seldom spared its inmates, and often carried them all off within a week's time. In noting these facts, Dr. Cabiadis was careful to take into account the various tenets of the different religious sects of the people of Bagdad; for while the Mohammedans discarding all sanitary precautions lived with and handled plague patients, the Jews and Christians, on the contrary, firmly believing in its contagious properties, very seldom *touched them*; yet all of them equally caught the disease if they *lived in the same house* with the plague patient, but were safe if they *quitted the house* the moment a case of plague occurred in it. Dr. Cabiadis quotes another remarkable fact in support of his theory. With *one exception* none of the physicians, surgeons, or assistants who daily attended on plague patients *caught that malady*, and he himself handled nearly 2,000 plague-smitten persons without suffering any inconvenience from it. To this it might be objected that the immunity enjoyed by them was owing to their *contact with the sick being a momentary one*. But, Dr. Cabiadis remarks, that if this be true with respect to the *physician*, it cannot be so with regard to the surgeon and assistant whose duties obliged them to prolong their stay near the patients for the purpose of opening abscesses, washing and dressing sores, &c. The exception alluded to above was that of *an assistant who actually died of the plague*. But in an epidemic outbreak affecting a whole population one death amongst an entire corporation would rather indicate the law that governed the general mortality at the time than the exceptional liability of that body for coming into contact with the diseased.

Dr. Cabiadis does not think that the *infectious matter* of the plague is contained in the *pus secreted from the buboes and sores*. Plague, he observes, is transmitted even in its *incipient stage* and before any of the swellings or boils have suppurated. The problem, therefore, remains to be solved, whether the *specific materies morbi* of plague is exhaled from the patients' respiratory organs, from his cutaneous surface, or from some other emunctory.

These considerations lead me to the important practical question of *fomites*. I was very anxious to obtain from Dr. Cabiadis the fullest information on this point, so as to clear up, if possible, this intricate subject. Dr. Cabiadis says, that he considered the *atmosphere* which surrounds a person affected with plague, as *the true medium of transmission*. Apart from this, he has also met numerous instances in which he believes the *clothes and bedding* of plague patients communicated the malady to sound persons living beyond the sphere of the epidemic outbreak. Such articles were made of wool, cotton, flax, or hemp. He ignores whether these materials in a *raw state* would have given the disease as well, since he has not met with any fact to enlighten him upon the subject.

Etiology.—The origin of plague and the causes that bring it into activity are utterly unknown.

Some persons have conceived the idea that a *marsh-miasm* might be the exciting cause of this pestilence, but Dr. Cabiadis refutes this idea by quoting the immunity from plague enjoyed by Bussorah and Kerbela, two of the dampest cities in Mesopotamia, and both of them *surrounded by marshes*. Kerbela, in fact, stands on an island in the midst of a marsh, the waters of which reach up to its very walls. Midhat Pasha, when Governor-General of Bagdad, built a fine new quarter at its south-west end; the whole of it, however, has now fallen down in consequence of the foundations being embedded in a slushy soil. Kerbela, therefore, according to the malaria hypothesis ought to be a spot favourable to the development of plague, and yet it has not been visited by that epidemic, notwithstanding that all the surrounding villages have been more or less attacked by it, and that persons suffering from the plague have gone to Kerbela and died there.

Some persons have fancied that eating *diseased camel's meat* might have caused the outbreak in Mesopotamia. In order to find out whether there were any truth in this assertion Dr. Cabiadis made a careful inquiry, but failed to discover any evidence in corroboration of it. He therefore infers that diseased camel's meat, like that of any other diseased animal, might *predispose* to an attack of plague, but not engender the malady.

Proximate cause.—The most palpable and evident of all the causes which predispose an individual to an attack of plague during an epidemic outbreak, is *poverty*. No other malady shows the influence of this factor in so striking a degree; so much so, indeed, that Dr. Cabiadis styles the plague *miseriæ morbus*. In his experience he found that the poor were seldom spared; the wealthy hardly ever attacked. *Cholera* also has a preference for the poor, but at the same time it spares not the rich, whereas plague attacks exclusively the poor. Here, again, Kerbela presents a striking proof of this fact. Its inhabitants are the most prosperous section of the whole population of Irak-Arabi (Turkish Arabia), and even its poorest classes can at all times live on a meat diet. Its streets are narrow and crooked, but the houses are spacious and well aired. Hillah is the very reverse of this: its houses are low, confined, and very imperfectly ventilated; they are, moreover, generally encumbered with a horse, with poultry, and with two or three buffaloes. These animals constitute the resources whence the lower classes of Hillah derive a livelihood by selling milk and eggs to the wealthier inhabitants, while they themselves limit their own nourishment to barley bread, dates, and onions, with sometimes fish in a putrescent state. It is needless to add that Hillah suffered severely from the plague.

Prophylactic Measures.—The most effectual means for the protection of a community against the propagation of plague—the isolation of the sick, the destruction by fire of their clothes, and the whitewashing with lime and free ventilating of the domiciles in which cases of plague occur. The plague *reappeared in only one* out of 350 houses which had been *whitewashed* after an outbreak of plague in them, whilst its reappearance in houses that had merely been abandoned for a time, after an attack of that disease, but which had not been whitewashed, *was of frequent occurrence.*

The other disinfectants tried, such as sulphur fumigations, lighting fires, and throwing a solution of sulphate of iron into the drains, gave no decided results, except when associated with the whitewashing and airing of the infected house.

Cordons Sanitaires.—Dr. Cabiadis believes that *cordons sanitaires*, properly enforced, are extremely useful in checking the extension of an outbreak of plague. The greatest vigilance, however, is required to render them efficient, because the persons put to guard these cordons often allow passengers to evade them, either through neglect of their duties, or through the persuasive influence of bribes. He strongly condemns, however, the practice adopted at one time in Bagdad of shutting up persons smitten with the plague in their houses, and placing guards round them to prevent communication with the rest of the population. The fear of this harsh and unreasonable measure, caused the inhabitants to *conceal* the existence of the malady, and even *to bury inside the house* those who succumbed from it; thus, deceiving the authorities, and helping to intensify and propagate the evil it was intended to mitigate.

Treatment.—Dr. Cabiadis can offer no suggestions worthy of trust, as to the best mode of treating plague. The remedies chiefly tried at Bagdad and at Hillah, were leeches, and mercurial frictions to the swellings, combined with the internal administration of phenic acid, or sulphate of quinine. In some cases these remedies were thought to do good, while in others they proved useless, if not detrimental, and Dr. Cabiadis is convinced that we know as little about the cure of this disease as we do about its essence.

He concludes his interesting notes on this subject by expressing astonishment and regret that no public hospital exists in Bagdad, an extensive city of 150,000 inhabitants.* A large *military* hospital was built there by Midhat Pasha, on a fine and healthy site, but no use has been made of it. He therefore suggests that the Government should turn it into a *civil hospital* for the benefit of the people of Bagdad.

Constantinople, February 10th 1879.

E. D. Dickson,
Physician to the British Embassy.

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* Population of Bagdad—

Shiah Mohammedans	70,000
Jews	30,000
Christians (chiefly Chaldeans) } Soonnee Mohammedans }	50,000
Total	150,000

III.

PAPERS ON THE MEDICAL ASPECTS OF QUARANTINE.

Paper I.

Extract from the Eighth Annual Report of the Medical Officer of the Privy Council.
(Mr. Simon.)

Foreign Epidemics of the Year [1865], and the General Question of Contagion in its bearings on the Public Health.

In relation to the spread of pestilential orders, the year 1865 was of extraordinary and most painful interest. That in this year, after more than a century's interval, the herds of England were revisited by the most malignant of bovine plagues—the, to them, unfamiliar murrain of the Russian Steppes, would in itself be a sad distinction of the year. But the eventfulness of 1865 was even less in that field of suffering than in relation to human epidemics; and, in the latter respect, to persons who had to care for the public health, the last nine months of the year were a time of continuous anxiety. First, early in April, it was rumoured that a disease of the nature of *Plague* coming from beyond the Ural Mountains, and causing depopulation in its course, had not only reached St. Petersburg, where it was said to be causing fearful ravages, but had spread beyond the Prussian frontier, and was prevailing, though in a less destructive form, at Dantzig and various other places in North Germany. Next, in June, came the importation of *Asiatic Cholera* into Egypt, and thereupon, radiating from Alexandria, for results which as yet have but begun, the renewed influence of this terrible infection in Europe. Thirdly, in September, there was the fact (hitherto, I believe, unparalleled in the epidemiological experience of this country) that an outbreak of *Yellow Fever*, fortunately not on a large scale, was occasioned to the population of Swansea by the arrival of an infected ship from Cuba.

It was but to a very limited extent that these important occurrences involved proceedings which technically were under the Public Health Act, 1858; and, strictly speaking, proceedings under that Act are all that I am called upon to mention here. I may, however, so far exceed that limit as to include certain other proceedings which the same occurrences involved, and which were of general sanitary interest: proceedings of the Lords of the Council, which were either taken under the Quarantine Act, or at least had regard to its administration.

1. The first of the occurrences to which I have adverted, the rumour in April last that a "Siberian Plague" was advancing towards this country, was one which, except for the proverbial faculty of rumour to distort as well as magnify what it represents, might have justified the greatest alarm.* And it was of course one which tended to raise a question of Quarantine. Under the circumstances, my Lords thought it expedient that the facts should be investigated from this Department, and, at their desire, I took the requisite steps for that purpose. Dr. Whitley was sent to St. Petersburg, and Dr. Sanderson to the country of the lower Vistula. The results of these investigations are contained in papers which I subjoin—App. Nos. 9, 10, 11†; viz., a report which I addressed to the Lord President on the 19th April, and reports subsequently made by the two inspectors. Briefly, I may here state that the rumour which gave rise to the inquiry had joined together and disfigured two mutually independent truths; one,

1. "Siberian Plague."

* Terrible inflictions have before now come to us by that line of transit, and cholera is not the only pestilence which has thus come. Apparently it was through Russia, and perhaps as a "Siberian Plague," that, five centuries ago, the Black Death came to England. That, according to the best authorities, the Black Death under the name of Pali Plague, still lives, and from time to time spreads, in the western and northern parts of India, and, when last told of, was even high in the Himalaya,—that if its infection passed the hills, little story would come to us of how it filtered through the sands of nomad and other savage life, but that presently it might be on the confines of Russia, and then again suddenly of the gravest European interest:—these are considerations which, in the minds of persons who know the facts of the case, would check all disposition to treat rumours of "Siberian Plague" with indifference.

† [Not reproduced, in these papers, from the original Report.]

that our well-known typhus and relapsing fevers were epidemic in St. Petersburg;* the other, that cerebro-spinal meningitis, a peculiar nervous fever hitherto scarcely known in England, was epidemic in parts of North Germany.

It is only with respect to the latter disease that I need here make any further statement. From communications which have been made to me since the time when the inspectors reported, and particularly from information for which I am indebted to Dr. F. J. Brown, of Rochester, and to Dr. Clapton, one of my colleagues at St. Thomas's Hospital, I have reason to believe that for some time past the disease has been present in small amount in this country. I subjoin (App. No. 12) the substance of the communications with which Dr. Brown and Dr. Clapton have favoured me. It is, in my opinion, unquestionable that some of the cases illustrate in sporadic form the same cerebro-spinal meningitis which in other countries has prevailed epidemically. And to this I may add two considerations. First, the morbid influence may perhaps to some extent show itself otherwise than in marked cases of idiopathic cerebro-spinal meningitis:—experience of parallel circumstances suggesting, as possible, that the mysterious "epidemic constitution" (as Sydenham would have called it) which favours the specific nervous fever in a given time and place, may also, to some extent, colour other diseases of the time and place with nervous, particularly tetanic or tetanoid, complications, and that an increased tendency to such complications may suffice to show the "epidemic constitution:" and both Dr. Brown and Dr. Clapton in their respective fields of observation are struck with evidence that of late this, or something like it, has been the fact. Secondly, it has to be remembered that till a disease is generally known to the medical profession, and is known by a distinctive name, solitary cases of it are easily confounded, either in fact or in name, with other more familiar diseases: that probably cerebro-spinal meningitis will thus to some extent be confounded with lockjaw and hydrocephalus, just as diphtheria ten years ago (when the present generation began to make their first practical acquaintance with it) was confounded, either in fact or in name, with various better known throat-affections and with scarlatina.

2. Asiatic Cholera again in Europe.

2. The choleraic infection of Egypt in May last, with the return of Mohammedan pilgrims from Mecca where the disease was epidemic, followed soon afterwards by the spread of the same infection, along each of the several lines of steamboat communication which diverge from Alexandria as a centre, to all the most considerable ports of the Levant and of Southern Europe; whence again in many instances inland spreadings of the disease took place;—this constituted a succession of events which augured badly for the public health in England. And presently, in the quarter where it was being looked for, a first wave of the infection had touched our shores, though happily not yet greatly to harm us. For the first time in our experience of cholera, the attack was on our south coast: not, as on former occasions, on our ports which look toward the Baltic: but on Southampton, distinguished among all our ports as the one of quickest Mediterranean traffic, and perhaps also (though this may have been secondarily) on Weymouth or Portland or Dorchester.

Of the epidemic progress which I have just summarily sketched, I do not attempt here to give the innumerable and somewhat intricate details, nor to compare the present course of the disease with steps of former visitations. On that subject, under their Lordships' orders, I requested Mr. [Netten] Radcliffe, honorary secretary of the Epidemiological Society, to compile a special report; and, for the purpose, I put into his hands all the abundant information which the Foreign Office had communicated to their Lordships. The elaborate report with which he has recently furnished me, and which I append *in extenso*, gives all information which has hitherto been obtained as to the epidemic progress, compares the present with former invasions, and gives some interesting supplementary information as to the Mohammedan pilgrimages, in their relation to the present subject. See App. No. 13.†

Of the very small share which England has yet had in the epidemic, the main facts are these. Into Southampton there came on July 10th, and at intervals afterwards, very suspicious arrivals from Alexandria, Malta, and Gibraltar. In the middle of August, a young woman in the town had a choleraic attack of doubtful nature; on the 22nd

* It may be worth noting, that among the very various information which reached me from Russia about the time when the above proceedings were in progress, I found, as one element of confusion in the popular impression of the case, that a carbuncular disease of cattle, which was prevailing in parts of Russia, and which, according to a well-known property of such diseases, had in some cases led to infection of human beings, was being spoken of as "Siberian Plague."

† [Not reproduced, in these papers, from the original Report.]

September a labourer had undoubted Asiatic cholera, of which afterwards he died; and from then, for about six weeks, cholera-cases continued to occur in small numbers in and about Southampton, so that on the 4th November (when the little epidemic might be considered at an end) there had been in all 60 such cases, of which 35 had terminated in death.

It is a question whether from Southampton, or in any more direct way, the morbific influence may in August or September have reached Weymouth or Portland or Dorchester: I have no proof that any such infection took place: but accidentally I am informed that a gentleman from a distance, who early in August was spending a week in Weymouth, and visiting both Portland and Dorchester, contracted during that week a diarrhœa which on his return home developed to severe cholera; and in September there occurred, in the neighbourhood of London, the following events, which give peculiar interest to the question. Mr. G. and his wife, inhabitants of Theydon-Bois, near Epping, had been lodging at Weymouth for seventeen days from the 8th September, had visited Portland on the 22nd, and Dorchester on the 23rd, and returned home on the 25th. On the evening of the 23rd Mr. G. had been seized with diarrhœa, sickness, and cramps, which continued more or less through the next day, and left him still unwell on the morning of the 25th. He, however, performed his journey to Epping with his wife. She, during the journey, began also to complain of abdominal discomfort; and this, after her return, developed, with gradually increasing diarrhœa, to cholera, of which (in its secondary fever) she eventually died on the 11th October. On the 30th September (while the last-named patient was still in collapse) one of her daughters, aged eight, was seized with cholera, and in a few hours died. That same night, a serving-lad in the house was seized with cholera, and barely escaped with his life. On the 2nd October, the doctor who was attending them died of cholera, after 10 hours' illness. On the 3rd, another daughter of the house, aged 16, passed into cholera, but eventually, after some consecutive fever, recovered. On the 5th, a maid-servant got diarrhœa, which, though relieved for the time, relapsed and become choleraic on the 8th, and she, after some promise of recovery, fell into secondary fever, with which she eventually died. On the 5th also a labourer who worked on the premises, but lived apart, was taken with diarrhœa, which, passing on to cholera and collapse, killed him next day but one. On the 6th, the head of the house, the Mr. G. who had suffered at Weymouth, and had ever since had relaxed bowels, got a very acute new attack, and died after 15 hours. On the same day his son was attacked with diarrhœa, and next day was in collapse, but rallied, and finally got well. Also on the 6th, the grandmother of the house was similarly attacked; and she, though she emerged from collapse, eventually died on the 14th. On the 10th, a woman living near by, whose only known connexion with the above cases was that on the 8th she had assisted in laying out the dead body of the above-mentioned labourer, was taken with choleraic purging, which soon led to collapse, and next day to death. Thus, within a fortnight, in that one little circle, eleven persons had been attacked with cholera,—mother, father, grandmother, two daughters, son, doctor, serving-lad, servant, maid, labourer, and country-woman; and of these 11, only three survived—the son, a daughter, and the serving-lad. Later, in the country-woman's family, there was another fatal case. It cannot well be doubted but that the exciting cause of this succession of events was, in some way or other, the return of the parents from Weymouth—of the father with remains of choleraic diarrhœa still on him, of the mother with apparently the beginnings of the same complaint. But this is only part of the case, and the remainder teaches an impressive lesson. All drinking-water of the house came from a well beneath the floor of the scullery; and into that well there was habitual soakage from the water-closet. Whether, in intimate pathology, there are any essential differences between the cholera which kills on a large scale, and the cholera which kills single victims, is hitherto so entirely unknown, that it would be idle to discuss, as a separate question, whether the G. illness, contracted at Weymouth and carried to Epping, was "epidemic" or "sporadic," "Asiatic" or "English," cholera; and as above stated, I cannot prove it to have been an offshoot of the Southampton epidemic, or otherwise of Mediterranean origin. Certain, therefore, only is this:—that from the time when Mr. and Mrs. G. returned ailing to their home, the discharges which passed from their bowels gave an additional and peculiar taint to the already foul water-supply of their household, and that thenceforth everyone who drank water in the house drank water which had in it the ferment of decomposing diarrhœal matters.

In relation to these, on the whole, inconsiderable manifestations of epidemic cholera in England, proceedings under directions of the Lords of the Council were taken as

follows. With the assistance of Dr. Parkes, Professor of Military Hygiene at Netley Hospital, I watched the progress of the epidemic at Southampton, and addressed to the local authorities such suggestions as were necessary. And as soon as information came of the lamentable occurrence at Theydon-Bois (which unfortunately was not until all the above-described mischief had been accomplished) I instructed Mr. [Netten] Radcliffe to investigate the facts, and to give such advice as might be useful. Professor Parkes made peculiarly exact inquiry into all the circumstances connected with the beginnings of the epidemic in Southampton, and into the relations of the cases to one another; and I append his report *in extenso*—No. 14;* not only for the positive information which it contains, but also as a useful illustration of the extreme difficulty which in all such matters there is in proving or disproving contagional relations. From Mr. Radcliffe's report I append (No. 15)* the section which describes in detail the circumstances of the infected water-supply.

And here terminates, for the year 1865, the history of cholera in England. What may be the facts of 1866, or what eventually will have been the share of England in the present pandemic diffusion of the disease, are questions on which no materials for exact judgment exist, and where at any rate hope may be preferred to prediction.

3. Yellow fever at Swansea.

3. The outbreak of Yellow Fever at Swansea in September last was in one respect an event of extreme importance. That England is not insusceptible of this tropical infection, but that (at least under favouring circumstances) yellow fever can seriously damage a port-side population in England: this truth was conclusively discovered in Swansea at the cost of fully 15 lives. Doubtless the atmospheric conditions under which the proof was given were conditions not habitual to our climate. Especially the heat was almost tropical. But no one can predict of any given year that its summer shall not reproduce the conditions which characterised the summer of 1865; nor can any one say that, if yellow fever infection should again begin to operate on our population, the mischief may not infinitely exceed those limits within which on the recent occasion it was confined. And accordingly, for the purposes of hygienic police, the outbreak to which I refer must be deemed to have given a most impressivewarning.

The broad facts of the case may be told in very few words under the following two heads. First, the *Hecla* left Cuba on the 26th July with cases of yellow fever on board, had successive new cases till towards the end of August, entered Swansea harbour on the 9th September, with one of her seamen dying and two others but convalescent from the fever, and was immediately moored alongside a wharf; where she landed her sick, discharged (though not uninterruptedly) her cargo, and remained stationary till the 28th; when remonstrances, which at last had become irresistible, led to her being removed from within the dock. Secondly, from September 15, six days after her arrival, to October 4th, six days after her removal, Swansea witnessed the entirely new phenomenon of yellow fever attacking in succession some 20 inhabitants of the town, besides others who suffered less definitely, or more mildly; and this not indiscriminately over the whole large area of Swansea, but only in definite local relations to the ship: while at Llanelly there also fell sick in the same way three of the crew of a small vessel which had been lying for two days alongside the *Hecla* at Swansea.

While this mischief was in progress, notice of it came to the Lords of the Council. On the 14th September, I received from the Registrar-General information which the Swansea registrar had written him to the following effect;—that he had just registered the death of a man, aged 38, as caused by "exhaustion from fever, probably "yellow fever;" that "this man was landed from a yellow fever infected ship, and "died within three hours of being landed, in one of the dirtiest courts of Swansea, his "death probably hastened by such removal;" and that the case had created much excitement in the town, as several deaths occurred on board the ship after leaving Cuba, and several of the crew were affected when the ship was brought into port. On the 26th I received intelligence from the Registrar-General that a death by yellow fever had occurred among the population of Swansea,—viz., that a man, of whom it was stated that he had gone on board the infected vessel soon after her arrival, had died of yellow fever after five days' illness, and that other attacks of yellow fever were reported. Hereupon, under their Lordships' orders, and with the assistance of Dr. Buchanan, as inspector, I immediately took measures to investigate the details of the case, and to advise the local authorities on their management of the danger which had arisen. The very interesting report which Dr. Buchanan made to me at the end of the outbreak is appended *in extenso*. See App. No. 16. And I may refer to that

* [Not reproduced, in these papers, from the original Report.]

report for all details, both as to the ætiological connexion of facts in the case, and also as to the circumstances under which the intentions of the Quarantine Act had been frustrated.

I have said that the outbreak which I have described was, so far as I know, unparalleled in the experience of England. Indeed, anywhere on this side of the Atlantic, yellow fever is a rare phenomenon; and, on the few occasions when it has been epidemic in Europe, even the northmost latitude where it has been seen has been south, and almost invariably much south, of the southmost latitude of England. Five years ago, however, France was startled, as now England has been, by an outbreak of yellow fever in a latitude where the disease had never before been epidemic—namely, at St. Nazaire, at the mouth of the Loire.* The Lords of the Council, as administrators of the Quarantine Act, had the facts of that occurrence brought before them—facts, in many respects, similar to those of our own outbreak, though the results were more complicated and more injurious. And I propose here to recount these facts; presuming that the liabilities of England in the matter of yellow fever may for practical purposes be deemed identical with the liabilities of St. Nazaire; and contending, therefore, that our Swansea lesson may be made additionally suggestive when studied in the light of that second instance. The story, as I got it from the official communications, was briefly this:—That about June 13 the *Anne Marie*, a wooden sailing vessel, loaded with cases of sugar, left Havannah, where yellow fever was epidemic;—that between July 2 and July 12 attacks of yellow fever occurred on board; that on July 25 she arrived at St. Nazaire, where, "20 days having elapsed since the last "death, and 13 days since the last case [attack] of illness," she was admitted to free pratique;—that till the 3rd of August she was being unloaded by labourers of St. Nazaire;—that many of these labourers were, on the 5th and 6th of August, attacked with yellow fever;—that previously (on the 2nd, 3rd, and 4th of August respectively) the mate of the *Anne Marie* who had remained on board, a cooper who had been "employed to repair the cases," and a stone-cutter "who had been working "on the quay near to the *Anne Marie*," had been attacked with illness which, in at least the first two, was believed to be yellow fever;—that, moreover, on August 1, the *Chastan* (which now was at Indret, but previously had been at St. Nazaire, lying alongside the *Anne Marie*) had had a first attack of yellow fever, and that by August 5 all the five men who formed her crew had been attacked;—that, when the place of the *Chastan* beside the *Anne Marie* was taken by the *Dardanelles*, a boy in charge of the *Dardanelles* (the only person on board her) contracted yellow fever;—that the *Cormoran* which had been taking cargo from the *Chastan* while alongside the *Anne Marie*, had, after some days, two cases of yellow fever on board;—that a steamer of the Lorient Company, having remained two days in harbour near the *Anne Marie*, had, on returning to Lorient, two of her crew attacked with yellow fever;—that two lighters from Indret, having also remained two days near the *Anne Marie*, had afterwards their crews, seven or eight in number, attacked with "a kind of half-yellow fever;"—finally, that an eighth vessel, the *Arequipa*, which had also remained for several days near the *Anne Marie*, and had on August 1 sailed for Cayenne, but been detained off the French coast by bad weather till August 5, had on August 5 a first attack of yellow fever, and had other attacks at intervals during the six or seven weeks following. It was alleged, moreover, that while the above events were in progress, certain of the patients, being on shore at St. Nazaire and its neighbourhood, communicated yellow fever to two or three, and slighter illness of the same kind to some others, of the persons who were about them; but, without going here into any minute discussion of these cases, I may state, as the conclusion to which a careful study of the official papers led me, that, in my opinion, it was only in a very qualified sense, if at all, that communication of yellow fever by means of personal intercourse could be said to be proven by the cases.† The total mischief done by the outbreak was set

Yellow fever in 1861 at St. Nazaire.

* The latitude of St. Nazaire is about 47° 17′ N., which is some 4⅛ degrees south of Swansea. The northmost place, where it had ever before been epidemic, in France is, I believe, Rochefort, about 46° N. Portsmouth in the state of New Hampshire of the United States represents, I believe, the northernmost latitude at which it has ever been epidemic on the other side of the Atlantic; the latitude, namely, 43° 4′ N.

† "In one very important case (that of M. Chaillon) the sufferer is said not to have been near the ship, but to have contracted the infection from certain labourers who came infected from the ship, and whom he attended medically ['frictioned'] at their homes. In a second case, one of the ship labourers, who himself had yellow fever, is said to have carried the infection certainly to his wife, and perhaps to an old man in whose house he and his wife lodged; for these two had attacks of yellow fever, the old man fatally; and though it was 'not known as a certainty' by M. Mélier that the old man had not been near the ship, it seems agreed that the woman had not been there. [H.M. Consul, Sir A. Perrier, eventually found reason to believe that

down at 44 cases of yellow fever, resulting in 26 deaths from the disease. It was stated that, at the time when the *Anne Marie* arrived in port, there was no other vestige of yellow fever at St. Nazaire, or in its neighbourhood; that neither yellow fever nor anything like it had ever before existed in the district; and that no other yellow fever was seen in that summer on this side of the Atlantic. The description given of St. Nazaire was this:—"The town is partly built on the strand, and is "tolerably healthy: its vicinity is marshy, and subject to intermittent fevers—perhaps "more than usually so this year: nevertheless, nothing uncommon was observed in "the state of public health." The weather is said to have been extremely hot—"more like that of a tropical than of an European climate."

Before closing my account of these two little outbreaks of yellow fever in exceptionally northern latitudes, I ought to state that, though nothing of quite the same sort had previously occurred either in England or France, yet, in both countries, some slight and almost overlooked warnings, to the same general effect, had been given. Thus, in France, though apparently yellow fever had never touched the ordinary land-population or spread from ship to ship any where so far north as St. Nazaire, probably, on a few occasions, and in a very small amount, the disease had been seen in the quarantine establishment of a still more northerly port—that of Brest, attacking now and then some official whose business had been with a newly arrived infected ship.* Dr. Buchanan's inquiry at Swansea elicited that probably on two or three occasions a solitary case of yellow fever had occurred there under like circumstances. At Southampton too, on one occasion, in 1852, it happened that an engineer of an infected ship was attacked with yellow fever on shore eight days after the ship's arrival in port.† And it is alleged that also at Southampton, in the years 1852–3, the landing of yellow fever patients from infected ships led on three occasions to ill results, as follows:—that in one case, witnessed by Mr. Wiblin in December 1852, it was believed that a convalescent from yellow fever infected two members of his family, who afterwards infected three others, with illness much less severe than ordinary yellow fever, but having at least some affinity to it; that in another case, witnessed by Mr. Dusautoy, in the summer of 1853, a woman died with symptoms of yellow fever shortly after having washed the clothes of a seaman who had been landed with that disease; that, in the remaining case witnessed by Mr. Wiblin in July 1853, it was believed that a yellow fever patient, taken to the Southampton poor-house, communicated his disease, in a fatal form, to another inmate of the establishment. It is proper to add that, in some of the above cases, medical controversy was raised as to the nature of the disease. Of course no absolute judgment can now be given on

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both these persons had been exposed to chances of direct infection from the ship.] In some other cases, persons who apparently had not been near any affected ship, but had attended patients from the *Chastan*, were attacked, though but slightly, with symptoms very suggestive of yellow fever. M. Mélier's belief with regard to the several just cited cases is, that they were cases of true contagion, using the word 'contagion' in the sense in which we call smallpox and typhus contagious. Without pretending to controvert this belief (which on other grounds may or may not be tenable) I would observe that it is not a necessary consequence of the facts recorded in the present papers. The facts, supposing no exception taken to them, would be to this effect:—that labourers who had spent time in the hold of the *Anne Marie*, and had caught yellow fever there, carried with them some power of infection; and that a like power, much feebler in degree, went also with the crew of the *Chastan*. But almost unquestionably, with regard to the *Anne Marie*, and not improbably with regard to the *Chastan*, it seems that the ship, irrespectively of sick persons in it, was a focus of yellow fever infection. And, on this showing, the alleged facts admit of more than one interpretation. Whether, namely, the men carried infection because they themselve had contracted yellow fever, or merely carried infection passively as they might have carried an odour from the ship,—whether men who had laboured in the hold of the *Anne Marie* without themselves contracting yellow fever there might equally have carried infection to their homes,—whether they who carried infection might have been disinfected by soap and water and change of dress,—whether, in short, the infective power belonged, not to the sick body, as such, and to its excretions and discharges, but to the mere washable surface and clothing which had been saturated with the atmosphere of the ship; this question remains unanswered by facts in the present record. And I draw attention to that openness of the question, because of its all-important bearing on the practical issue, whether it was necessary to adopt at St. Nazaire the system of personal quarantine which certain of M. Mélier's regulations enforced."—Extract from Office-Memorandum on the St. Nazaire outbreak. The distinctions which I have drawn as to the mode in which yellow fever might have been (if it was) communicated by personal intercourse at St. Nazaire, and the doubts which I have intimated as to the provenness of true contagion there, are equally applicable to the discussion of the somewhat similar facts which are reported tohave occurred 13 or 14 years ago at Southampton.

* Particulars of one such occurrence (which took place in 1856) are given in the Bulletin de l'Académie de Médecine, vol. xxii.

† See the case, as reported by Mr. Wiblin, in the (Lancet) of 1853. I may note here that the ship was a wooden one, and that the engineer, though lodging on shore, had been spending much of his time in the ship. Also I may note that in our present ignorance as to the incubation-time of yellow fever, we cannot absolutely say that the disease was not latent in the man when he first landed.

questions of fact which so many years ago were in dispute; but, so far as the statements are accepted in proof of the communicability of yellow fever by personal intercourse, the acceptance must be qualified with the same considerations as I have expressed in regard of the corresponding statements at St. Nazaire.* In the thirteen years which have elapsed since the occurrences in question, persons, more or less ill with yellow fever, have on numerous occasions been landed at Southampton from West Indian steamers; but in no case, so far as my information extends, has it even been suspected that their disease has spread to other persons. Nor did anything of this kind arise in connexion with the above-mentioned case of the engineer who ran the whole course of his disease in Southampton.

Question of Contagion in relation to the Public Health.

The various incidents to which the last preceding pages have been given possess in common one particular kind of interest. For, when the public mind is troubled with facts or rumours of epidemic visitation, question always arises how far the mischief can be stopped or prevented by restrictions on the ordinary freedom of traffic, national or international. And since the present report records the coincidence of several cases wherein that question was raised, it may be convenient that I here briefly state the principles on which such cases have been considered.

When phenomena of pestilence are under popular discussion, and most of all when quarantine is being spoken of, frequently language is used which seems to imply a belief that the medical profession is divided as it were into two camps, respectively of "contagionists" and "anticontagionists." Now, so far as my knowledge extends, I will venture to say (speaking of course of the medical profession as represented by its acknowledged teachers) that no such duality of opinion exists. That many of our worst diseases acquire diffusion and local perpetuity by means of specific infective influences which the sick exercise on the healthy is an elementary truth of medicine; and among persons who are competent to distinguish the certainties from the uncertainties of science, there is no more doubt, broadly, as to that truth than there is doubt as to the diurnal and annual movements of the earth.† Ambiguities which fifty years ago existed in respect of some particular cases have since then been gradually cleared away;—sometimes through the ascertainment that seeming contradictions of fact were facts of different diseases confounded under a common name;‡ sometimes through the new and conclusive evidence of well recorded cases and expements;§ sometimes through improved insight into the habits of a morbid poison;‖ and generally through that better grasp which time has given us of the subject as a whole. And more and more the once chaotic phenomenology of contagion is tending to become an intelligible and consistent section in the great science of organic chemistry.

On the other hand, not even the merest tiro in medicine supposes that contagion (as a morbific power acting from each sick centre) operates equally on all persons, or equally under all varying circumstances of place and time. Differences are obvious even to superficial observation, and such differences become still better appreciated as the general doctrine of contagion gets to be better understood.

First, as regards personal differences of susceptibility;—they are seen, on a small scale, when we observe with what different degrees of severity different persons and different families in similar external circumstances, and with similar exposures to contagion, suffer the diseases which they thus contract;—and, on a much larger scale, the same thing is seen in that permanent and complete insusceptibility which most persons acquire in relation to certain contagia which have once affected them: to small-pox, typhus, and measles, for instance: so that millions of persons who have

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* See Foot-note (*) at pp. 59, 60.

† In my sixth annual report, when discussing the subject of the spread of communicable diseases in hospitals, I stated with some detail, and need not now again state, the very different conditions under which different diseases are communicated. See Report for 1863, p. 53.

‡ Well, for instance, might there be difference of opinion about the communicability of "continued fever," while under that name typhus, typhoid, and relapsing fevers were all spoken of as one disease. So, too, in regard of syphilis, the old uncertainty as to the laws of the contagion depended in great part on confusion between two kinds of chancre.

§ Such, for instance, as those by which the contagiousness of typhoid fever and of cholera has been established.

‖ As for instance, in the knowledge which has been got as to the great development of contagious property in choleraic discharges some two or three days after their discharge from the body; or the knowledge of the different effect which one kind of syphilitic inoculation exercises on those who have, and those who have not, previously suffered from a like inoculation.

acquired that kind of immunity are being daily exposed to chances of contagion, but, whatever the quantity of the contagium, and whatever the external circumstances, do not suffer second attacks of the disease which they have once undergone.

Secondly, as the local circumstances vary in which a contagiously-diseased person is placed, so, pari passu, the power of contagion may show an almost infinite range of differences. Typhus and typhoid fevers, for instance, which, amid overcrowding and non-ventilation and refuse-odours and foul water supply, would develop themselves to be the most spreading of pestilences, will, in thoroughly clean atmospheres and with thoroughly clean water-supply, be so restricted in their infectiveness, that typhoid will scarcely be recognized as contagious, nor even typhus extend beyond limits which admit of being narrowly defined. Again, there are certain geological conditions which make the greatest difference (though probably only in an indirect way) to the spread of the diarrhœal infections.* And, even apart from such influences as the above, it seems doubtful whether all contagious diseases are equally capable of pandemic extension:—it is said, for instance, that hitherto neither scarlatina nor typhus has shown much disposition to spread either in Asia or in Africa.

Thirdly, the very important qualification has to be stated, without which no one can bring into an intelligible whole the epidemiology of different lands and different ages of the world, that, in the category of time, far out of human reach, there are circumstances which greatly influence contagion. Any one who will reflect on that most curious branch of natural history which treats of the various plagues which in different times have fallen, sometimes on man, sometimes on his fellow creatures of the animal or vegetable world, will be convinced that not fixed local conditions, and not mere more or less of international traffic can, either singly or conjointly, explain the wonderful fluctuations of effect. When the ordinary distribution of human disease on the surface of the globe is studied, it is easy to distinguish certain spaces, of larger or smaller area, within which certain well-marked forms of disease appear as though they were native to the soil; where the local pathology is almost as definite as the local fauna; but while some such diseases remain, so far as we know, permanently limited to places where they are endemic, others of them have once or oftener spread widely from their respective centres, have tended to general diffusion on the earth, and have then again retired within their former limits. Again, there are diseases, to which we cannot assign any definite local birthplace, but which, sometimes of prominent interest, and sometimes almost or quite lost to observation, are present on the earth's surface at different times in vastly varying quantities. Now, subject to qualifications of detail, it seems generally unquestionable that the diseases which in one or other of those ways immensely vary from time to time in the quantity of their known existence upon earth, are diseases which human intercourse can spread; and doubtless there are cases where quantitative differences of intercourse can be deemed a sufficient explanation of the quantitative differences of disease. No one, for instance, can doubt but that the changed relations of the two halves of the world after the discovery of America were enough to account for the subsequent dreadful sufferings of America by small-pox, and rendered plausible the hypothesis that the old world got syphilis from the new. Nor—to take a minor and collateral illustration, needs any one go farther than to the changed circumstances of our cattle-traffic within the last few years, in order to explain why the phenomenon of steppe-murrain infection is now again seen in England after an absence of more than a century. But not all the cases in question admit of such facile explanation. Thus,—for what reason it is that Asiatic cholera, during the last half-century, has had certain definite fits of pandemic extension, and has three times been exceedingly fatal in Europe, where previously it had been unknown or was forgotten; or why diphtheria, which scarcely had had a place in history till it overran Europe in the 16th century, and which since then had but rarely been spoken of, has for the last 10 years been an important disease in England; or why the plague of the Levant has within the last century or two become an almost obsolete disease; or why the yellow fever of the tropics has in particular years raged

* This, in relation to cholera, has been more or less definitely observed throughout all the fifty years that the disease has been studied; first abundantly in India, and afterwards in Europe. See Hirsch's Hist. Geogr. Pathologie, Vol. I., pp. 134–146. In 1848–49, when I first had to do with the disease, though but in one city, the fact forced itself strongly on my attention. See Reports on sanitary condition of city of London, pp. 95–100 and 223–25. The subject has much prominence given to it, and is admirably treated in Professor Pettenkofer's contributions to the report of the Royal Bavarian Commission on the cholera epidemic of 1854. See also footnote, p. 63. The bearing of the geological influence, however, is apparently none but this: that where populations are living in certain geological conditions, there, unless engineering science have supplied artificial drainage and water-supply, the local atmosphere and drinking-water will almost certainly be much polluted by those fæcal impurities amid which the diarrhœal contagia are peculiarly apt to multiply.

furiously in parts of Europe; or why our black death of the 14th century, now not extinct in India, has never but once been in Europe; or what has become of our sweating-sickness of three centuries ago;* or whence has come the modern importance of cerebro-spinal meningitis;—these are questions which, even separately, but most of all when considered in their mutual connexion, are seen to admit of no explanation from a merely biological basis. The student must enlarge his view to regard the chemistry of the surface of our globe as subject to variations, perhaps definitely progressive or cyclical, in which human epidemics are but a part. If popular pathology, working on its few local facts, sees something of this in the "unhealthy seasons" which arise in exceptional circumstances of rain-fall and temperature: if some such "atmospheric" influence must be invoked to explain, even for a single climate, the fluctuating fatality of the most ordinary of zymotic diseases;† if, as recent researches render probable, the variations of typhoid fever in a single town cannot be understood without reference to the varying water-level in the local soil, and to the physical and chemical consequences of its alternate rises and falls;‡ much more is the truth to be appreciated when the field of consideration widens to the epidemiology of the world, and especially when the great pestilences are regarded which have made epochs in human history. Those almost explosive arisings or spreadings of disease are facts of cosmo-chemical disturbance which no mere contagionism can explain. The powers by which such disturbances may be made, the nearer and remoter influences which may vary chemical transformation upon the earth, are hitherto, perhaps, rather guessed at than known; but it seems probable that the so-called caprices of epidemics will never be adequately explained till the interpreter has for his context a true knowledge of those cosmical influences, and of the "caprices" to which they too are subject.

* The English sweating-sickness was first seen in 1486, when, as a disease previously quite unknown, it started apparently from somewhere in Wales. A second epidemic of it came in 1508; a third in 1518, when it spread from England to the French coast; a fourth and most severe in 1529, when it spread from England over great part of the continent of Europe; and a fifth in 1551. The disease then entirely vanished. A century afterwards a new disease (which has been known down to our times, chiefly in France, as miliary fever, or *la suette*) somewhat resembling the old English disease, but also with definite differences from it, sprang up as suddenly at Leipzig as Ovid's famous Nereid in Ortygia. And that disease, familiarly as it is known in France, is, I believe, unknown in England.

† TABLE showing the Number of Deaths in England from each of certain Zymotic Diseases in each of the 23 years for which the record has been made.

Years.	Scarlatina.	Diphtheria.	Measles.	Hooping Cough.	Small-pox.	Fever.	Diarrhœa, Dysentery, and Cholera.
1838	5,802	—	6,514	9,107	16,268	18,775	3,440
1839	10,325	—	10,937	8,165	9,131	15,666	3,493
1840	19,816	—	9,326	6,132	10,434	17,177	4,799
1841	14,161	—	6,894	8,099	6,368	14,846	4,198
1842	12,807	—	8,742	8,091	2,715	16,201	7,622
1847	14,697	—	8,690	9,260	4,227	30,994	15,630
1848	20,502	—	6,867	6,862	6,903	22,037	15,604
1849	13,111	—	5,464	9,615	4,645	18,347	74,155
1850	13,370	—	7,080	7,770	4,666	15,375	14,400
1851	13,594	40	9,370	7,905	6,997	17,930	18,045
1852	18,813	74	5,846	8,022	7,320	18,641	21,754
1853	15,653	46	4,895	11,200	3,151	18,554	20,502
1854	18,325	203	9,277	9,770	2,808	18,893	42,092
1855	17,128	186	7,354	10,185	2,525	16,470	15,044
1856	13,931	229	7,124	9,225	2,277	16,182	15,912
1857	13,919	310	5,969	10,138	3,936	19,016	24,037
1858	25,481	4,836	9,271	11,648	6,460	17,883	16,004
1859	19,907	9,587	9,548	8,976	3,848	15,877	20,597
1860	9,681	5,212	9,557	8,555	2,749	13,012	11,185
1861	9,077	4,517	9,055	12,309	1,320	15,440	20,999
1862	14,834	4,903	9,800	12,272	1,628	18,721	12,667
1863	30,475	6,507	11,349	11,275	5,964	18,017	16,801
1864	29,700	5,464	8,323	8,570	7,684	20,106	18,366

‡ I refer particularly to a paper by Professor Buhl, in the first volume of the *Zeitschrift der Biologie*, and to a corroborative paper by Dr. Seidel in a latter part of the same volume, on the relations of typhoid fever in Munich to the fluctuations of water-level in the wells of the city. These papers, however, only represent, with regard to typhoid fever, the continuation of a line of study which had been opened with regard to cholera by Professor Pettenkofer of Munich; whose many valuable contributions to the science of cholera deserve the most grateful acknowledgments from all who are interested in the subject. According to this author, the best *soil* for cholera is a porous soil, easily penetrable by air and water, and in which water is to be found not far below the surface, and which is foul with excremental matters; and the *times* when such a soil is aptest to multiply cholera-contagium are times when the water-level in it is falling after having reached an unusual height. The degree in which a given cholera contagium, when imported, produces epidemic results is, according to Professor Pettenkofer, essentially determined by the degree in which its importation coincides with the fulfilment of those two conditions of place and time.

I have dwelt on the above qualifications in order that I may not be misunderstood in the remarks which I am about to make, doubtless in the contagionistic point of view, on the foreign diseases which came under consideration in 1865. Of these, for my present purpose, cholera is infinitely the most important. Cerebro-spinal meningitis, if diffusible by human intercourse, is not so in a high degree. Yellow fever (apart from other considerations concerning it, to which I shall hereafter advert) may at present be assumed to have little or no tendency to spread in this country. But with cholera the case is different. Not disregarding the qualifications which I began by setting forth; not asserting that the mere uniform influence of contagion would account for the several fitful spreadings of cholera from the East; not ignoring that the power of the cholera-contagium in our climate varies almost infinitely according to local circumstances, and specially according to those circumstances which regulate the distribution of typhoid fever; I yet, for public health purposes, deem it quite essential to insist on the evidence which is now accumulated in all the archives of European Medicine, attesting the contagiousness of cholera.

The doctrine on this subject which in my opinion deserves, in the present state of knowledge, to be accepted as practically certain—sufficiently certain, I mean, to be made the basis for precautionary measures, may be stated in the following propositions:—that, when cholera is epidemic in any place, persons who are suffering from the epidemic influence, though perhaps with only the slightest degree of diarrhœa, may, if they migrate, be the means of conveying to other places an infection of indefinite severity; that the quality of infectiveness belongs particularly, if not exclusively, to the matters which the patient discharges, by purging and vomiting, from his intestinal canal; that these matters are comparatively non-infective at the moment when they are discharged, but subsequently, while undergoing decomposition, acquire their maximum of infective power: that choleraic discharges, if cast away without previous disinfection, impart their own infective quality to the excremental matters with which they mingle, in drains or cesspools or wherever else they flow or soak, and to the effluvia which those matters evolve; that if the cholera-contagium, by leakage or soakage from drains, or cesspools, or otherwise, gets access, even in small quantity, to wells or other sources of drinking-water, it infects in the most dangerous manner very large volumes of the fluid; that in the above-described ways even a single patient with slight choleraic diarrhœa may exert a powerful infective influence on masses of population among whom perhaps his presence is unsuspected; that things, such as bedding and clothing, which have been imbued with choleraic discharges, and not afterwards fully disinfected, may long retain their infectious properties, and be the means of exciting choleraic outbreaks wherever they are sent for washing or other purposes.

The precautions, generally, which may be taken against contagious diseases are of two kinds:—first, if possible, to prevent the entrance of the contagion;—secondly, if the contagion be present, to annihilate as far as possible the circumstances which favour its spread.* And thus, as regards cholera, a first and incalculably important question, to be answered by those who have to care for the public health of a country, is the question, whether, by any measures of quarantine, they can provide that all contagion of the disease shall be kept outside the limits of their land.

Quarantine.

Subject to one qualification, which is not an important one for the present argument, it may, I think, be accepted as certain that quarantine, conducted with extreme rigour, and with the precision of a chemical experiment, will keep cholera out of any part of Europe in which the extremely difficult conditions can be absolutely fulfilled;† and, thus, if I speak to the dry question of medical practice, I have no hesitation in saying

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* To the above-mentioned two kinds of precautions may be added, with regard to many important cases, a third, as follows:—So far as practicable, not to bring into personal relation with the sick, as attendants or otherwise, any persons who have not before acquired, or probably acquired, an insusceptibility to the existing disease. In typhus-epidemics, for instance, economies of valuable life may often be made by preferring for employment as nurses, doctors, inspectors, and so forth, persons who have already once had typhus. The same principle applies to many other contagious fevers; but I have no evidence that it in any degree applies to cholera. If I mention yellow fever in this note it is not with any intention of classing it as a contagious fever in the sense in which typhus is contagious; but, as the same principle of conduct is involved in both cases, this may be a convenient place for observing, that when yellow fever is epidemic in districts, persons to be sent into those districts ought, as far as possible, to be only persons who have already had that disease.

† The qualification with which the above opinion is guarded relates to the uncertainty how far the mysterious influence which starts, and perhaps accompanies, each pandemic extension of cholera, is an influence which creates new centres of "spontaneous generation" for the disease. As regards Europe, there seem to be strong presumptions against the likelihood that any such new centres are created. But this negative cannot be deemed absolutely certain; and of course the qualification becomes more and more important, in proportion as the country to which the question applies is near to those countries where cholera first had its beginning.

that England ought to resist cholera by quarantine. On the other hand, though I cannot pretend to discuss with any kind of authority the non-medical aspects of the question, it would be mere pedantry for me to ignore that facts which are of common notoriety, and considerations which are of common sense, conflict with that medical conclusion. A quarantine, which is ineffective, is a mere irrational derangement of commerce; and a quarantine, of the kind which ensures success, is more easily imagined than realised. Only in proportion as a community lives apart from the great highways and emporia of commerce, or is ready and able to treat its commerce as a subordinate political interest, only in such proportion can quarantine be made effectual for protecting it. In proportion as these circumstances are reversed, it becomes impossible to reduce to practice the paper-plausibilities of quarantine. The conditions which have to be fulfilled are conditions of national seclusion; and the fulfilment of such conditions by England would involve fundamental changes in the most established habits of the country.

In order to illustrate this view, the medical postulates of quarantine deserve to be considered in detail. Quarantine, purporting to be effectual, cannot rest satisfied with excluding from entry such persons as are obviously sick, but indispensably for its purpose, must also refuse to admit the healthy, till they shall have passed in perfectly non-infectious circumstances, at least as many days of probation as the disease can have days of incubation or latency;—this condition often involving as its consequence that, if one case of disease arise among a number of persons in quarantine, the whole number of apparently healthy must recommence their period of probation, and this perhaps again and again. Now, setting aside, as not essential to quarantine, the cruelties which its mal-administration involves, and which in practice are almost identified with its exercise: criticising only the conditions which quarantine, if it is to be effective, must involve, and, for the moment, not even counting as an objection the cost of that gigantic establishment which has to be permanently maintained in order to meet occassional exigences: I here insist only upon the restrictions.* Considering what they, when really carried into effect must involve—what inconvenience to persons, what interruption to commerce, and on how vast a scale, and for what indefinite duration of time, no one can expect, in regard of great trading communities, that governments, if they go so far as to enact, will have much success in enforcing quarantine. Against the efficiency of it, when enacted, there operate some of the strongest of all law-breaking influences; on the one hand, instincts of contempt for the narrow self-protectiveness which it represents, and, on the other, those eager commercial interests which now mainly govern the world. The latter, in proportion as they are affected, elude the restrictions which would embarrass them. Contraband of quarantine, like ordinary smuggling, is developed as soon as the inducements for it are considerable. And thus, practically speaking, where great commercial countries are concerned, it can scarcely be dreamt that quarantine restrictions will be anything better than elaborate illustrations of leakiness.

In respect of England, moreover, there are other facts to be stated. In 1832–3, when some sort of quarantine against cholera was adopted here, the results gave no encouragement to a repetition. Then followed the erroneous belief (which subsequent better knowledge has corrected) that the spread of cholera is unaffected by human intercourse. Under these and other influences the thought of quarantine in England became more and more obsolete, and the possibility of enforcing it, if ever so much desired, fell more and more towards nothingness. Probably there was the practical conviction that, against any contagious disease current on the continent of Europe, quarantine, of the utmost strictness which England could hope to attain, would not give results worth the sacrifice. I daresay that quarantine in England was never

* It may be convenient to consider the restrictions in some detail, and with cholera to illustrate their bearing. The incubation time of cholera, in the strict medical sense of the words—*i.e.*, the time which elapses between the moment of infection and the moment when critical inquiry may first discover an altered (though perhaps but very slightly altered) action of the bowels, may be not more than two or three days; but practically the incubation-time of the disease must be regarded as of much longer duration—as continuing, namely, till the symptoms are so far developed that the sufferer cannot overlook or disguise them; and this point in the progress of the disease may not be reached till the first slight looseness of bowels (which many persons would overlook or deny) has continued for many days, or, it is said, even for weeks. If for the purposes of the argument we assume that an allowance of ten days will cover the time during which infection can be latent or designedly concealed; which, however, is less than the time on which quarantining governments insist, and I believe, only half the time of an average quarantine in Greece: and if we translate into practical language what this would mean, if England had quarantine against the continent: it would be, that ten days would be the minimum time in which any person, sick or healthy, could enter England from the continent:—that, for instance, our present 90 minutes between Calais pier and the Dover railway station would become an affair of at least ten days, and that no national advantage from quarantine could be promised, if this rule were in any single case relaxed or evaded.

otherwise than very lax. And at all events for many years past it has, in every medical sense, been abolished. Also with its virtual extinction, the establishment for giving it effect has declined. As successive governments advanced further and further in relinquishing what probably at its best was only a sham of quarantine, corresponding reductions of establishment were made. And the result of the entire process may be told in these very few words,—that, at the present moment England has not in readiness the means of properly quarantining even a single ship.* It is not for me to say that this state of things may be deemed final. But if reversal of the policy which it expresses were ever so much desired, it could not be effected offhand. Enormous first expenditure of money in creation of proper lazarets would be wanted, as well as subsequent very large annual outlays for maintaining the necessary establishments. And the time which would be required for bringing the organisation into work forbids the supposition that this could ever be done on emergency.

So, for England, under present circumstances, quarantine against cholera, as existing in the countries which are nearest to us, is a precaution of which there can be no serious thought. Were the country ever so ready to endure those extreme restrictions without which the whole thing is fruitless and absurd, the means for imposing them do not exist.† To extemporise a *cordon sanitaire* is simply and totally impossible; and no partial quarantine can be relied on for national purposes. Not only as regards cholera, but generally as regards all contagious disease, the position, which now has to be recognised and dealt with, is—that contagions current on the continent of Europe must be deemed virtually current in England.

Having regard, however, to our entire unprotectedness by quarantine against any contagions which may threaten us from abroad, I feel it additionally incumbent on me to insist on the present very imperfect state of our sanitary law and administration. Especially in view of the present re-infection of Europe by Asiatic cholera the necessity for a better state of things seems to me of the most urgent kind.

On the one hand I would beg leave again to refer to the evidence which is summed up in my last report, and is corroborated by new instances in the present one, as to the very extensive inoperativeness of the Nuisances Removal Acts in England.

And on the other hand I would refer to the observations, which conclude my letter (Appendix No. 9)‡ addressed to the Lord President in April last, on the powerlessness of local authorities in regard of certain dangers of contagion. The footing on which the country now stands in relation to foreign contagions is, I apprehend, this;—that they have to be dealt with like our ordinary home-bred contagions; that for preventive purposes, no action, or at least no effectual action, can be taken by the general executive of the country; that, so far as any good is to be got out of proceedings directly against contagion, this, like the good of indirect proceedings, has to be sought in the vigour of local authorities. It, therefore, becomes quite essential that the position of local authorities generally, in regard of contagion, should be reviewed. As to contagions already current in the country, practically any diseased person scatters his infection broadcast almost where he will—typhus or scarlatina, typhoid or small-pox, or diphtheria; and, under present circumstances, if cholera were in a district, the patient with choleraic diarrhœa would form no exception to the general license. I cannot say that the exceptional case of the foreign infection seems to me of more importance than the every day case of our native diseases; but I would venture to submit that with regard to both classes indifferently, the present unlimited license seems urgently to demand restriction. As in the case of typhus or typhoid, so also in the case of cholera; or to use one general description, in the case of any dangerous contagious disease; the local authority, I submit, ought to have the power of requiring from the diseased person that, in regard of residence and otherwise, he shall so conduct himself as not unnecessarily to multiply the chances of extending his infection to others.

* It may be proper to mention that the ceremonies to which, under the name of quarantine, certain transatlantic ships are subjected, on their arrival in this country, have not, properly speaking, any medical significance in relation to this country, but are part of an international obligation contracted for commercial reasons.

† When cholera last year broke out so vehemently at Alexandria, and was hitherto not in Europe, it would have been, comparatively speaking, a trifle to quarantine arrivals from that one port; not only because of their being few, in comparison with the innumerable arrivals from the ports of continental Europe, but also because, with the long voyage, the object of quarantine would generally have accomplished itself before arrival. And medically, of course, such a precaution was to be desired. But while my Lords still had it under consideration, whether to establish this amount of quarantine, and to provide the means of conducting it, cholera had already almost ceased at Alexandria, and had shown itself in other various ports. Before proper quarantine arrangements against Alexandria could have been organised, no quarantine would have been self-consistent which had not been a quarantine against France, Turkey, Spain, Italy, and Germany, as well as against our own possessions of Malta and Gibraltar; and doubtless the contagium of cholera was in Southampton long before any effective arrangements could have been called into existence for excluding it.

‡ [Not reproduced, in these papers, from the original Report.]

Subject to the condition that proper hospital accommodation can be offered, the authority ought to be able to enforce, in regard of any dangerous contagious disease, that the sufferer should not be in circumstances which promote the spread of disease to the general population. This power, exercised in seaport towns in relation to the poorer classes who might arrive infected from abroad, would in effect work thus:—such persons would be debarred from resorting to the common lodging houses and crowded tenement houses of the town, and would (as much to their own advantage as to that of others) be constrained to go to the local hospital, there to remain till cured. How far such a power for local authorities would be delegable to them under the Quarantine Act, or would require special legislation, is perhaps not a question of any ultimate importance, and is one which I am not competent to discuss. It deserves notice, however, that if the power in question were vigilantly used by local authorities, and in conjunction with other sanitary powers, its exercise would not of necessity be only of local effect, but might under some circumstances contribute even importantly, to those national purposes which quarantine is intended to accomplish.*

[Note by Assistant Medical Officer, Feb. 1879.—It will be seen from the paper which follows on pages 70-74, "On the Systematic Action in usein " England to prevent the Importation of Infectious Diseases," how much progress has been made by general English legislation since the writing of this report in 1865, a progress which has concerned alike imported infections and infections of home origin.]

Essentially different from the danger which attends the migration of persons affected with cholera or its premonitory symptoms, is the possibility, illustrated by the Swansea experience of last October, that ships infected with yellow fever may introduce that infection into England. I do not pretend to say that yellow fever is absolutely non-contagious in this country: non-contagious, I mean, in the sense in which typhus and small-pox are contagious; much less do I pretend to say that it is absolutely non-contagious in climates hotter than our own. This doctrine, however, even in the extremest form in which it can be stated, is not only held by many persons of high authority who have studied the disease in its trans-atlantic strongholds, but is certainly rendered extremely probable by facts which we have observed in Europe. When Lisbon in 1857 was being so terribly scourged by yellow fever, thousands of its population fled far and wide into surrounding districts; among those who thus fled, numbers were already incubating the disease, and of course fell with it in their respective places of refuge more or less distant from Lisbon; in 182 cases of this description, the Portuguese Government caused inquiry to be made whether persons about the sick fugitive had shown any signs of the infection; and the answers were, that in no single case had this occurred. So again in our Swansea experience, nothing like personal contagion seemed probable. And though undoubtedly at St. Nazaire there were a few facts which led M. Mélier to impute contagiousness to the disease, the overwhelming majority of facts pointed, even there, to an opposite conclusion, and suggested that in the exceptional instances some source of fallacy had been overlooked.

* For obvious reasons it is only to a small extent that legal restrictions can avail to prevent the spread of such contagions as are once current in the country. They can only apply to conduct by which the public health is manifestly and directly endangered and not to all kinds of such conduct. But in proportion as the physiology of contagion gets to be better understood by the public, the influence of legal restrictions will be increased by the appeals which well-informed persons will be able to make, and to which the example of such persons ought to give force, against all reckless conduct in such matters. Conditions of lodgment, as discussed in the text, are not all that require consideration. Complaints are often made of the freedom with which persons imperfectly convalescent from contagious fevers (as, very notably, from small-pox) expose themselves in places of common resort; and a careless sending of sick children to school often does much to spread diphtheria, scarlatina, and other contagious diseases; the careless transmission of infected things to common laundries, and of course the traffic in infected rags, imply dangers of the same sort; and against all such sorts of action the public ought to have some ready means of protecting itself. So, too, as regards the use of public carriages by persons contagiously diseased; no doubt a proper organisation for the conveyance of sick persons ought to form part of the medical relief arrangements of every large town, and the use of the common public carriages ought then to be forbidden; but if, as often happens in our present circumstances, persons who have small-pox and other dangerous contagious diseases cannot be taken to hospital except in common street cabs, surely the subsequent disinfection of every such carriage might be insisted on. Other dangers are for personal, rather than municipal, precaution. For instance, the modes by which puerperal fever is spread, and the extreme and fatal sensibility of puerperal women to the contagion of scarlatina, are matters which require, both generally from the public, and specially from persons who visit from one sick room to another, far more thought than is yet given to them. See App. No. 7.,† and Sixth Report, p. 59. Here also, I may observe, for the consideration of those whom it concerns, that our new institution of Turkish baths, used in common by swarms of persons—by some more or less for health, but by numbers also for mere enjoyment or curiosity, involves (inter alia) some awkward chances of syphilitic contagion: indeed Turkish baths are now among recognised means of treatment for persons with constitutional syphilis, who, in some cases, have local symptoms by which the disease can be communicated: and the question whether such patients take the general run of public baths, and are among the numbers who nakedly occupy the seats and couches of common sweating-rooms, is one which may greatly concern other frequenters of such establishments.

† [Not reproduced, in these papers, from the original Report.]

Quite unquestionable, however, is the evidence that the infection of yellow fever accompanies marine traffic from land to land; and in proportion as the belief is untenable that the disease is personably contagious, in such measure the alternative must be accepted —that infectiveness is in the body of the ship. That yellow fever is a malarious rather than a truly zymotic disease, is a disease of the nature of ague rather than a disease of the nature of typhus,—that the ship which spreads infection does so irrespectively of the persons who are in it, whether they be healthy or diseased,—that the ferment of a local and impersonal infection clings to the ship from shore to shore, and breeds new malarious action in any congenial soil to which it comes,—that the exceptional and contingent power of persons to spread the disease is generally but a very scanty and transient power, not belonging particularly to the sick, but to the healthy in common with them, attaching perhaps mainly to their dress, and equally predicable of all absorbent things which the atmosphere of the ship has imbued;—this, it seems to me, is the doctrine of yellow fever which tallies best with our present knowledge of facts. Without pretending to dogmatise theoretically on a subject which no doubt has its difficulties, I am strongly of opinion that preventive measures based upon that doctrine are, under present circumstances, amply sufficient for the practical purposes of this country. If it were, as far as practicable, provided that, during summer weather, ships which might reasonably be suspected of yellow fever infection should not come into close relation with shore or other shipping till they, and all things in them which might carry infection, had undergone thorough disinfection, this, in my opinion, would probably suffice to prevent in future any such unfortunate occurrence as the late outbreak of yellow fever at Swansea. I append as bearing upon this suggestion (App. No. 17*) the regulations which were put in force by the French Government on occasion of the disaster at St. Nazaire, and therewith the remarks which I submitted to the Lords of the Council on the question of the applicability of such regulations to this country. It will be observed that the suggestion which I have just given corresponds in principle to one large part of the French regulations. And there is not, in my opinion, any present reason for supposing that England would get additional security by adopting against yellow fever the system of personal quarantine which other of the French regulations enforce.

JOHN SIMON.

PAPER 2.

MINUTES MADE BY THE MEDICAL OFFICER (MR. SIMON) TO THE LORD PRESIDENT OF THE PRIVY COUNCIL RESPECTING MERCHANDISE ARRIVING IN ENGLAND FROM COUNTRIES AFFECTED WITH PLAGUE.

No. 29,755.

Foreign Office Letter, June 16, 1875.

The question suggested by the telegrams concerning Wool from the Plague-Districts of Mesopotamia are two; first in regard of Turkey, and secondly, in regard of the United Kindom.

1. As regards Turkey, I presume that Bagdad opinion would be very strongly against receiving, unpacking and manipulating, Wool from the neighbouring districts which have plague in them. I am not prepared to say that this wool would (unless in certain very improbable cases) be apt to cary the infection of plague from one part of Mesopotamia to another; but neither am I prepared to say that the local objection to receive it is unreasonable; and the case does not appear to me to be one in which the Government of this country could with advantage offer any sort of suggestion.

2. As regards the sanitary interests of our own country, if Mesopotamian wool is to be deemed capable of bringing plague-infection to the United Kingdom, there would be no precaution to which I should attach importance, as of real value against that danger, except the precaution of absolutely debarring the wool from entry here; and if Mesopotamian wool is to be deemed capable of infecting us, the same sort of danger may probably be ascribed more or less to other commercial exports of Mesopotamia.

I do not enter here on the question how far it might be possible to separate Mesopotamian merchandise from other exports of Turkey and Persia; but I would note that, even if it were quite possible in the present case to make such separation, the question which is now raised about the comparatively compact commerce of Mesopotamia might to-morrow easily be raised with regard to Syria or to Egypt; and it is requisite to remember what vast commercial exclusions would have to be enforced in certain cases, if the principle were accepted that merchandise in such cases must be treated as dangerously infectious. Government would probably not feel justified in

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* [Not reproduced, in these papers, from the original report.]

adopting this policy, even to the extent of excluding merchandise shipped from Bussora, unless there were strong grounds for believing that the absence of the precaution would be a real danger to the public health of this country. On this point, for obvious reasons, there cannot at present be absolute certainty; but the presumption seems to be extremely strong, that England would not suffer by any merchandise it might receive as above.

It is now more than 150 years since any part of Western Europe has suffered from the infection of plague; but, till a comparatively late period, more or less of the disease has been habitual or frequent in the Levant; and though occasions have been very numerous when arrivals from the Levant in this country must have been under conditions of infinitely more apparent danger than those which are now represented, the experiments thus performed on the public health of England have in no case led to any injurious result. Allegations, dating 150 or 200 years back, that in certain cases merchandise from plague-infected places has carried infection with it, are not such as could in the present day be accepted without very careful scientific sifting; and against such allegations there stands the remarkable negative evidence to which I first referred: evidence on a very large scale, and of a sort which requires no detailed examination. The last important delivery of scientific judgment on the facts concerning this question was given in 1846 by a special Commission appointed by the French Academy of Medicine, to report, for the information of the French Government, on plague in its relation to quarantine: the judgment delivered on the point here in question was—"Rien ne prouve que les marchandises puissent transporter la peste hors des foyers "épidémiques." And the argument which the Commission used in support of this conclusion consisted mainly in the statements of two great facts, as follows:—"En "1835, la peste épidémique sévissait à Alexandrie sur les employés de tout grade "habitant dans les magasins du gouvernement Égyptien. Cependant une très grande "quantité de balles de coton journellement maniées par les hommes de peine furent "expédiées de janvier à juin, c'est-à-dire pendant toute la durée de l'épidémie, dans tous "les grands ports de l'Europe, sans qu'il en résultât aucun accident de peste. Il en fut "porté en 1835: en Angleterre, 31,709 balles; à Marseille, 33,812; à Livourne, 424; "en Hollande, 150; à Trieste, 32,263; dans divers ports, 32. Ces balles de coton, "nous le répétons, ne donnèrent la peste à personne, quoique aucune précaution n'eût "été prise pour les désinfecter. Soumises à la presse, en dehors du navire, elles étaient "ensuite entassées dans un espace aussi étroit que possible; les écoutilles étaient "fermées, et on expédiait ainsi le navire. Sur 16 navires anglais chargés de coton qui "quittèrent Alexandrie du commencement du janvier à la fin de juin, 8 eurent la peste "à bord, et cependant le coton chargé sur ces navires ne fut pas plus dangereux que celui "des navires non infectés. Nous terminerons, messieurs, ce que nous avions à dire "sur la transmissibilité de la peste par les marchandises, en arrêtant votre attention "sur un fait d'une grande portée, et qui est positivement et officiellement reconnu. "Depuis 1720, aucun des portefaix employés dans le lazaret de Marseille au déchargement et au maniement des marchandises n'a contracté la peste."

Under the circumstances I evidently have no facts which would justify me in stating it to be necessary for the public safety that wool or other merchandise from Eastern places infected with plague should be excluded from this country; and believing (as above stated) that nothing short of exclusion could be deemed of practical effect in regard of any real danger, I of course do not recommend measures which, if not superfluous, would in my opinion be illusory.

J.S.

July 3rd, 1875.

P. C. O.

No. 21,755.

In postscript to my preceding note, and with reference generally to the importability of morbid infections from the Levant by means of the materials of commerce, I would observe that the branch of trade which ought to be regarded as most open to the suspicion of danger (if danger is to be suspected of any branch whatsoever) is, I think, undoubtedly the Rag Trade.

In regard of many infectious diseases, it is well known that certain sorts of things used by the sick—such as their clothing, bedding, towels, handkerchiefs, napkins, &c.,

get imbued with infective matters, and are thus rendered for a longer or shorter time capable of conveying infection. In places where great epidemics are prevailing, and where often in consequence of death households are being more or less broken up, articles such as the above are very apt to pass into the hands of Rag-Collectors, and to form part of their general merchandise. It is not possible at present to measure at all accurately the quantity of danger which this merchandise represents to communities eventually receiving it, but certainly it would not be uniform for all diseases. Some infective products of disease, for instance, the discharge from small-pox pustules, can, if quickly dried, retain for a long while their infective power, while of others apparently the power soon ceases; and according to differences of that sort, the Rag-Trade would of course be more open to suspicion in regard of some diseases than in regard of others. Some years ago, under my Lords of the Council, I took measures to inform myself as far as I could of the then state of experience in England on this subject; and the result of an extensive inquiry (the particulars of which are set forth in my 8th annual Report) was, that, except to some extent in regard of small-pox, no accusations were made against the rags in any of the 86 paper-mills which were visited by their Lordships' inspector. The history of plague makes it, I think, not probable that that disease gives a long-lasting infectiveness to absorbent articles which have been in use by the sick; but I do not feel myself entitled to say that danger in that respect could under no circumstances arise in the commercial relations of Europe to the Levant; and I think the present opportunity might be a favourable one for bringing under consideration of the Turkish and Egyptian Governments, à propos of plague, but not exclusively in relation to it, the question whether they, by appropriate police arrangements in their respective territories, could provide some sort of security for Europe that infectious rags (*i.e.*, rags which may have been exposed to infection) shall not at any time be exported from places where dangerous infections are prevalent.

J. S.

July 5, 1875.

Paper 3.

From the Supplement to the Seventh Annual Report of the Local Government Board (1877).

Memorandum by the Medical Officer (Dr. Seaton)—originally prepared for the information of the Colonial Office—on the Systematic Action in use in England to prevent the Importation of Infectious Diseases.

1. Of systematic action adopted in England for the prevention of the importation of infectious diseases the system of quarantine (in the commonly received sense of that term) forms an extremely small part, if, indeed, it may not be said to be abandoned; an altogether different system, called the system of medical inspection, having for some time past been employed. It is true that, to a limited extent, and as regards a single disease (yellow fever), quarantine, as regulated by the Quarantine Act (6 Geo. IV. cap. 78), is still practised, but its practice as regards this disease is not really with any sanitary object, but solely with the view of relieving our maritime commerce from disabilities which would else be imposed upon it by other countries, in which quarantine is regarded as an essential part of their public health administration. The regulation, moreover, of quarantine in England is not a function of that Department of the Government which is concerned with sanitary administration (the Local Government Board), but is a function of the Privy Council Office, which, aided by the Board of Trade, deals with it as an international commercial question. Certain duties which, under the Quarantine Act, and some subsequent Acts referring to it, are assigned to the Local Government Board, are not really for purposes of quarantine properly so called, but of the system which is in this country substituted for it; and the only duty which the Local Government Board actually performs in respect to *quarantine proper* arises when, in the administration of the Quarantine Act, the Privy Council Office has occasion to refer to it on medical questions.

2. So far as regards quarantine itself, I would further observe that although the Quarantine Act provides for land quarantine and the quarantine of inland waters, as well as for maritime quarantine (internal and external quarantine so to speak), it does not appear that internal quarantine has ever been enforced in this country since the Act was passed. Maritime quarantine alone has been practised, and this has been

applied to three diseases only, all of them infectious diseases of foreign origin, viz.: plague, cholera, and yellow fever. Of plague there has been no question in English ports for the last 30 years or thereabouts. Against cholera, quarantine has not been enforced since 1858, its futility as a precautionary measure in this country having then been abundantly manifested. Yellow fever is the sole disease at present subjected to it in our ports, and this, as already stated, not from the medical necessity, but from the commercial exigency of the case. The only quarantine establishment now remaining in England—that at the Motherbank—is maintained in respect of this disease. Infectious diseases habitually current in this country, such as small-pox, scarlet fever, &c., notwithstanding that the phraseology of the Quarantine Act covers *any* "infectious disease or distemper," have always been in practice exempt from quarantine, and dealt with under the general sanitary law of the kingdom. It appears to have been recognised that measures primarily designed to prevent the introduction into the country of diseases only coming to us from abroad, and which involved international considerations, would be misapplied if used for the purpose of preventing the importation of diseases ordinarily existing here, the limitation of which and not the exclusion could alone be in question.

3. The measures which have been substituted for quarantine against cholera—the only foreign epidemic which at present much concerns the health of this country—consists in this "system of medical inspection," the details of which are set forth in the Order of the Local Government Board dated the 17th July 1873. [*See* p. 74 of these papers.]

This plan differs from "quarantine" in the following essential respects:—

(*a.*) It affects only such ships as have been ascertained to be, or as there is reasonable ground to suspect of being, *infected* with cholera or choleraic diarrhœa (no vessel, according to the Order, being deemed infected unless there has been actual occurrence of cholera or of choleraic diarrhœa on board in the course of the voyage);

(*b.*) It provides for the detention of the vessel only so long as is necessary for the requirements of a medical inspection, for dealing with the sick (if any) in the manner it prescribes, and for carrying out the processes of disinfection;

(*c.*) It subjects the healthy on board to detention only for such length of time as admits of their state of health being determined by medical examination.

The measures for dealing with the sick under this Order are but an adaptation to a particular exigency of the principles of sanitary administration with regard to infectious diseases which are in force under the general sanitary law of the kingdom.

4. But though quarantine has no practical existence in this country, except as regards yellow fever, and all other infectious diseases are dealt with either under the general sanitary law of the country, or such modification of it as has been just described with regard to cholera, the machinery which is maintained under the Quarantine Acts for obtaining information as to the existence of infectious diseases on board foreign-coming ships is made available for dealing with all diseases of that kind, whether they are quarantinable or not. The quarantine questions, as they are termed, which it is the duty of the Customs to put to the masters of all such vessels embrace *all* infectious diseases; and, in the event of any such disease not of a quarantinable kind being found to exist on board, or to have existed in the course of the voyage, the quarantine officer is required to detain the vessel and to forward the information with the least practicable delay to the sanitary authority of the port. In regard to cholera, moreover, both the Customs and the sanitary authority have certain powers of detaining the vessel specified in the Order of the Local Government Board above referred to.

5. The provisions under Articles 12, 13, and 14 of the Order of the Local Government Board as to the mode of dealing with persons who may arrive from abroad infected with cholera will be better understood if a succinct statement be made of the ordinary provisions of the law with regard to infectious diseases in England. The authorities which have to administer that law, as now existing under the Public Health Act, 1875, are the urban, rural, and port sanitary authorities of the districts into which the whole kingdom is divided, and these authorities are empowered—

(*a.*) To provide hospitals or temporary places for the reception of the sick (section 131);

(*b.*) Where a hospital or place for such purpose is provided, to remove thither by order of any justice, on a certificate signed by a legally qualified medical practitioner, any person who is suffering from any dangerous infectious disorder, and is without proper lodging or accommodation, or lodged in a room

occupied by more than one family, *or on board any ship or vessel* (section 124);

(*c.*) To make regulations (to be approved by the Local Government Board) for removing to any hospital to which the Local Authority is entitled to remove patients, and for keeping in such hospital so long as may be necessary, any persons brought within their district by any ship or boat, who are infected with a dangerous infectious disorder (section 125);

(*d.*) To provide and maintain a carriage or carriages suitable for the conveyance of persons suffering under any infectious disorder (section 123);

(*e.*) To cleanse and disinfect infected premises and articles therein, to destroy any bedding, clothing, or other articles which have been exposed to infection from dangerous infectious disorder, giving compensation for the same, and to provide all necessary means for the disinfection of infected things (sections 120, 121, 122);

(*f.*) To take proceedings against (1) any person who while suffering from any dangerous infectious disorder, wilfully exposes himself without proper precautions against spreading the said disorder in any street, public place, shop, inn, or public conveyance, or enters into any public conveyance without previously notifying to the owner, conductor, or driver thereof that he is so suffering; or, (2) any person who, being in charge of any person so suffering, so exposes such sufferer; or (3) any person who gives, lends, sells, transmits, or exposes without previous disinfection, any bedding, clothing, rags, or other things which have been exposed to infection from any such disorder; or (4) any owner or driver of a public conveyance who shall not have immediately provided for the disinfection of such conveyance after it has to his knowledge conveyed any person suffering from a dangerous infectious disorder; or (5) the owner of any house in which any person has been suffering from any dangerous infectious diorder who shall knowingly let it or part of it for hire without having previously disinfected it, and all articles therein liable to retain infection, to the satisfaction of a legally qualified medical man; or (6) any person who, showing for the purpose of letting for hire any house or part of a house, shall make false statements as to the existence of infectious disease therein, or within six weeks previously (the several acts here enumerated constituting offences liable to penalty under the Public Health Act, sections 126, 128, 129);

(*g.*) To provide mortuaries, and to obtain the removal thither by order of a justice of the body of one who has died of any infectious disease which is retained in a room where persons live or sleep, or of any dead body in such a state as to endanger the health of the inmates of the house or room in which it is retained (sections 141, 142);

(*h.*) To make inspection of their district with a view to ascertain what nuisances exist calling for abatement under the powers of the Act, and to enforce the provisions of this Act in order to abate the same (section 92): a provision which extends to shipping, any ship or vessel lying in any river, harbour, or other water, within the district of a sanitary authority, being subject to the jurisdiction of that authority in the same manner as if it were a *house* within such district;

(*i.*) Finally, to appoint a medical officer of health, inspector of nuisances, or several of those officers, according to the needs of the district, and other requisite officers to aid them in the proper and efficient execution of the Act (sections 189, 190). The duties of the medical officer of health and of the inspector of nuisances when (as is the case in the greater number of instances) the assent of the Local Government Board has to be given to their appointment, are set forth in Orders of the Board dated the 11th November 1872.

The general powers above enumerated, if exercised duly and with reasonable diligence, will be found, it is conceived, sufficient to provide for the exigencies which may arise in our ports from the introduction of infectious diseases by ships, whether the disease be current in this country or be of foreign origin not naturalised here; but in the case of a non-naturalised disease, such as cholera, certain additional securities are taken by the Order of the 17th July 1873. The general powers, moreover, which are available against the importation of infectious diseases by shipping are available also, and have on occasions been used, against their exportation in like way to other places.

6. With respect to the importations of infectious diseases from abroad, it may be convenient to state in some detail the course pursued by the Customs acting under the Quarantine Act, and by direction of the Privy Council, in assisting the local sanitary authorities. On the 20th April 1861, the Commissioners of Customs addressed a circular letter (No. $\frac{35}{1861}$) to the collectors of the several ports, directing them to "instruct the proper officers at their ports, in the event of the arrival of a vessel in "which there was any case of cholera, small-pox, typhus, or typhoid fever, or in "which any disease whatever was extensively prevalent, forthwith to report the same "to the local authorities, in order that they may take such measures as they see fit "for the protection of the public health within their jurisdiction." This direction has been acted upon since that date, and in 1873, under a minute ($\frac{1114}{1873}$) dated 2nd October, the Commissioners gave instructions that the practice of interrogating vessels from Foreign followed in the Port of London should be observed at all ports in the United Kingdom, so far as local circumstances would admit. The practice referred to is thus described in this minute:—

> "*Statement of the practice pursued at the Port of London for the interrogation of masters of vessels arriving from Foreign as to the health of the crew and passengers.*"
>
> "Every vessel arriving at the Port of London from Foreign is bound to hoist her colour by day and to exhibit a light by night on reaching the quarantine ground,* for the information of the boarding officer. On seeing such signal the officer visits the vessel and interrogates the master as to the health of the crew and passengers (if any), and whether any deaths or sickness has occurred on board during the voyage; whether he has any bill of health, and, if from the Mediterranean, British Consul's bill of health, failing which the vessel is detained and the case reported to the Board. If all questions are answered in a satisfactory manner, the vessel is allowed free pratique, and the 'quarantine certificate' is issued, without which no vessel is allowed to Report.
>
> "If there has been any sickness of an infectious or contagious character, or even of a doubtful nature, or the character of which is unknown by the master, the vessel is detained and inspected by the proper medical officer.
>
> "Should a vessel arrive from any port infected with cholera or 'suspected,' the printed cholera questions are put, and if the answers are satisfactory, the vessel is cleared, but if otherwise, she is detained and the medical officer of health [of the sanitary authority]† is immediately apprised, and on the receipt of a certificate from such medical officer that there is no infectious illness on board, the vessel is allowed to proceed.
>
> "Every vessel from Foreign, without any exception, is questioned verbally as to the health of all persons on board, but as regards the continental passenger steam vessels, to prevent unnecessary detention, the questions are put in as brief and condensed a form as possible."

7. In the statement in paragraph 5 on the provisions existing for dealing with infectious disease I have not thought it necessary to advert (as being foreign to the purpose of this memorandum) to the powers which the Local Government Board have under section 130 and sections 134–140 for issuing regulations, in the event of formidable epidemics, for certain purposes, as for speedy interment of dead, house-to-house visitation, providing medical treatment, &c., &c. Nor have I thought it necessary to advert to the powers vested under the Quarantine Act, partly in the Privy Council and partly in the Local Government Board, but which are not in exercise, to issue orders on any unforeseen emergency.

8. The relative advantages of the system of medical inspection and of quarantine as against cholera in the ports of Europe underwent the most thorough discussion at the International Sanitary Conference which was held in Vienna in 1874. A large majority of the delegates, including those from every State of the first rank except France, declared in favour of the former system. The minority, while adhering to quarantine, agreed to a system which would considerably diminish its stringency as

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* When no special quarantine ground has been appointed, this must be read as the boarding station of the port.

† The sanitary authority of every district exercises sanitary jurisdiction over all ports and shipping in its district, except where from topographical circumstances it has been found necessary to create a special port sanitary authority. The Public Health Act, 1875 (sections 287–293), empowers the Local Government Board to create such an authority, and to assign to it such powers, rights, duties, &c., provided for in the Act, and exercised by sanitary authorities in general, as may be necessary.—E.C.S.

heretofore practised. The proceedings of this Conference and its results are of considerable importance in respect to the subject of this memorandum. An abstract of its proceedings will be found in the Fifth Report (New Series) of the Medical Officer of the Privy Council and Local Government Board (1875).

9. A theoretically perfect quarantine, a quarantine which it should be impossible to break on any point, and which must of course include the full period of incubation of the particular disease quarantined against, would doubtless if practicable afford a certain higher degree of security against the introduction of disease than can be attained by mere inspection on arrival as to actual existence of disease. But where are the conditions for a perfect quarantine to be found? and at what cost would the experiment be carried on? On these points I cannot do better than quote the observations of my distinguished predecessor. "A quarantine which is ineffective," says Mr. Simon, "is a mere irrational derangement of commerce; and a quarantine of the "kind which ensures success is more easily imagined than realised. Only in proportion as a community lives apart from the great highways and emporia of commerce, "or is ready and able to treat its commerce as a subordinate political interest, only "in such proportion can quarantine be made effectual for protecting it. In proportion "as these circumstances are reversed, it becomes impossible to reduce to practice the "paper plausibilities of quarantine. The conditions which have to be fulfilled are "conditions of national seclusion."

August 1877. EDWARD C. SEATON.

APPENDIX TO FOREGOING MEMORANDUM.

ORDER of the LOCAL GOVERNMENT BOARD as to CHOLERA, 17th July 1873.

TO ALL URBAN, RURAL, AND PORT SANITARY AUTHORITIES;—

To all Officers of Customs;—

To all Masters of Ships;—

And to all others whom it may concern.

WHEREAS the Lords of Her Majesty's Most Honourable Privy Council, by an Order bearing date the 29th day of July 1871, after reciting certain provisions of an Act passed in the Sixth year of the Reign of His Majesty King George the Fourth, chapter seventy-eight, and of the Sanitary Act, 1866, and further that Cholera was then prevailing in certain parts of Continential Europe with which this Country had communication, and that it was requisite to take precaution, as far as practicable, against the introduction of that disease into this Country, did make certain rules, orders, and regulations in respect thereof, and by certain other Orders bearing date respectively the 3rd and 5th days of August 1871, did make further regulations;

And whereas under and by virtue of "The Local Government Board Act, 1871," all powers and duties vested in and imposed on Her Majesty's Most Honourable Privy Council by (among others) the said Sanitary Act, 1866, were, as regards England and Wales, transferred to and imposed on the Local Government Board;

And whereas Cholera is now prevalent in certain parts of Continental Europe with which this Country has communication, and it is expedient that the said rules, orders, and regulations should be rescinded, and other rules, orders, and regulations substituted in their place:

NOW THEREFORE, We, the Local Government Board, do hereby rescind all such rules, orders, and regulations in the above-recited Orders contained, except in so far as they apply to Scotland, or may apply to any proceedings now pending, and We do hereby Order as follows:—

Definitions.

Art. 1.—In this Order:—

The term "Ship" includes vessel or boat;

The term "Officer of Customs" includes any person having authority from the Commissioners of Customs;

The term "Master" includes the officer or person for the time being in charge or command of a ship;

The term "Cholera" includes Choleraic Diarrhœa;

The term "Sanitary Authority" has the same meaning as in "The Public Health Act, 1872";

The term "Clothing and Bedding" includes all clothing and bedding in actual use and worn or used by the person attacked, at the time of or during the attack of Cholera.

For the purposes of this Order, every ship shall be deemed infected with Cholera in which there is or has been during the voyage, or during the stay of such ship in a foreign port in the course of such voyage, any case of Cholera.

I.—*Regulations as to Customs Inspection.*

Art. 2.—If any Officer of Customs, on the arrival within the limits of any port in England of any ship, ascertain from the master of such ship or otherwise, or has reason to suspect, that the ship is infected with Cholera, he may detain such ship, and order the master forthwith to moor or anchor the same; and thereupon the master shall forthwith moor or anchor the ship in such position as such Officer of Customs shall direct.

Art. 3.—Whilst such ship shall be so detained, no person shall leave the same.

Art. 4.—The Officer of Customs detaining any ship as aforesaid shall forthwith give notice thereof, and of the cause of such detention, to the Port Sanitary Authority, if there be one, or otherwise, to the Sanitary Authority of the District within which the ship shall be detained.

Art. 5.—Such detention by the Officer of Customs shall cease as soon as the said ship shall have been duly visited and examined by the proper Officer of the Sanitary Authority; or, if the ship shall, upon such examination, be found to be infected with Cholera, as soon as the same shall be anchored or moored in pursuance of Art. 9 of this Order.

Provided, that if the examination be not commenced within twelve hours after notice given as aforesaid, the ship shall, on the expiration of the said twelve hours, be released from detention.

II.—*Regulations as to Sanitary Authority.*

Art. 6.—The Port or other Sanitary Authority at every port shall, as speedily as practicable, with the approval of the Chief Officer of Customs of such port, fix some place or places within the said port where any ship may be detained, moored, or anchored, for the purpose of these regulations.

Art. 7.—Any officer appointed by such Sanitary Authority to see to the carrying out of this Order, if he have reason to believe that any ship arriving within the district of such Authority, whether examined by the Officer of Customs or not, is infected with Cholera, or shall have come from a place infected with Cholera, may visit and examine such ship, for the purpose of ascertaining whether it is so infected; and the Master of such ship shall suffer the same to be so visited and examined.

Art. 8.—The Sanitary Authority, on notice being given to them by an Officer of Customs under this Order, shall forthwith cause the ship in regard to which such notice shall have been given, to be visited and examined by their Medical Officer of Health, or some other legally qualified Medical Practitioner, for the purpose of ascertaining whether it is infected with Cholera.

Art. 9.—The master of every ship which is infected with Cholera shall, after any such examination as aforesaid, as long as the ship is within the district of a Sanitary Authority, moor or anchor her in such position as from time to time the said authority shall direct.

Art. 10.—No person shall leave any such ship until the examination herein-after mentioned shall have been made.

Art. 11.—The Sanitary Authority shall, as soon as possible after the arrival of any such ship, cause all persons on board of the same to be examined by their Medical Officer of Health, or some other legally qualified Medical Practitioner, and shall permit all persons who shall not be certified by him, as hereafter mentioned, to land immediately.

Art. 12.—Every person certified by the Medical Officer of Health or Medical Practitioner making such examination, to be suffering from Cholera, shall be dealt with under any rules that may have been made by the Sanitary Authority under the 29th section of the Sanitary Act, 1866, or, where no such rules shall have been made, shall be removed, if the condition of the patient admit of it, to some hospital or place previously appointed for such purpose by the said Authority; and no person so removed shall leave such hospital or place until the Medical Officer of Health of the Authority, or some other legally qualified Medical Practitioner appointed by them, shall have certified that such person is free from the said disease.

If any person suffering from Cholera cannot be removed, the ship shall remain subject, for the purposes of this Order, to the control of the Medical Officer of Health, or some other legally qualified Medical Practitioner appointed by the said Authority; and the infected person shall not be removed from or leave the ship, except with the consent in writing of the Medical Officer of Health or other Medical Practitioner.

Art. 13.—Such Medical Officer of Health or Medical Practitioner shall give directions and take such steps as may appear to him to be necessary for preventing the spread of the infection, and the master of the said ship shall forthwith carry into execution such directions as shall be given to him by such Officer or Practitioner.

Art. 14.—Any person certified by such Medical Officer of Health or Medical Practitioner as aforesaid to be suffering from any diarrhœal or other illness which he may suspect to be Cholera, may either be detained on board the ship or taken to some hospital or other previously appointed place, and detained there, for any period not exceeding two days, until it be ascertained whether the illness is or is not Cholera.

Any such person who, while so detained, shall be certified by the Medical Officer of Health or Medical Practitioner to be suffering from Cholera, shall be dealt with as in the above Article relating to patients suffering from that disease.

Art. 15.—In the event of any death from Cholera taking place on board of such vessel while so detained, the master shall cause the dead body to be taken out to sea, and committed to the deep properly loaded to prevent its rising.

Art. 16.—The master shall cause the clothing and bedding of every person who may have suffered from Cholera on board such vessel, or who, having at any time been on board such vessel, shall have suffered from Cholera during the stay of such vessel in a Foreign Port, to be disinfected or (if necessary) destroyed; and if the master shall have neglected to do so before the ship arrives in port, he shall forthwith, or upon the direction of the said authority, cause the same to be disinfected or destroyed, as the case may require; and if the said master neglect to comply with such direction within a reasonable time, the Authority shall cause the same to be carried into execution.

Art. 17.—The master shall cause every part of the ship, and every article therein, other than those last described, which may probably be infected with Cholera, to be disinfected or destroyed, when required to do so by the said Authority, or by their Medical Officer of Health.

Given under our Seal of Office, this Seventeenth day of July, in the year one thousand eight hundred and seventy-three.

JAMES STANSFELD,
President.

JOHN LAMBERT,
Secretary.

NOTICE.—The Statute 35 & 36 Vict. c. 79., provides in Section 52 that "any person wilfully neglecting, or refusing to obey or carry out, or obstructing the execution of any rule, order, or regulation made by the Local Government Board under Section 52 of the Sanitary Act, 1866, shall be guilty of an offence punishable on summary conviction before two Justices, and be liable to a penalty not exceeding *Fifty Pounds.*"

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.