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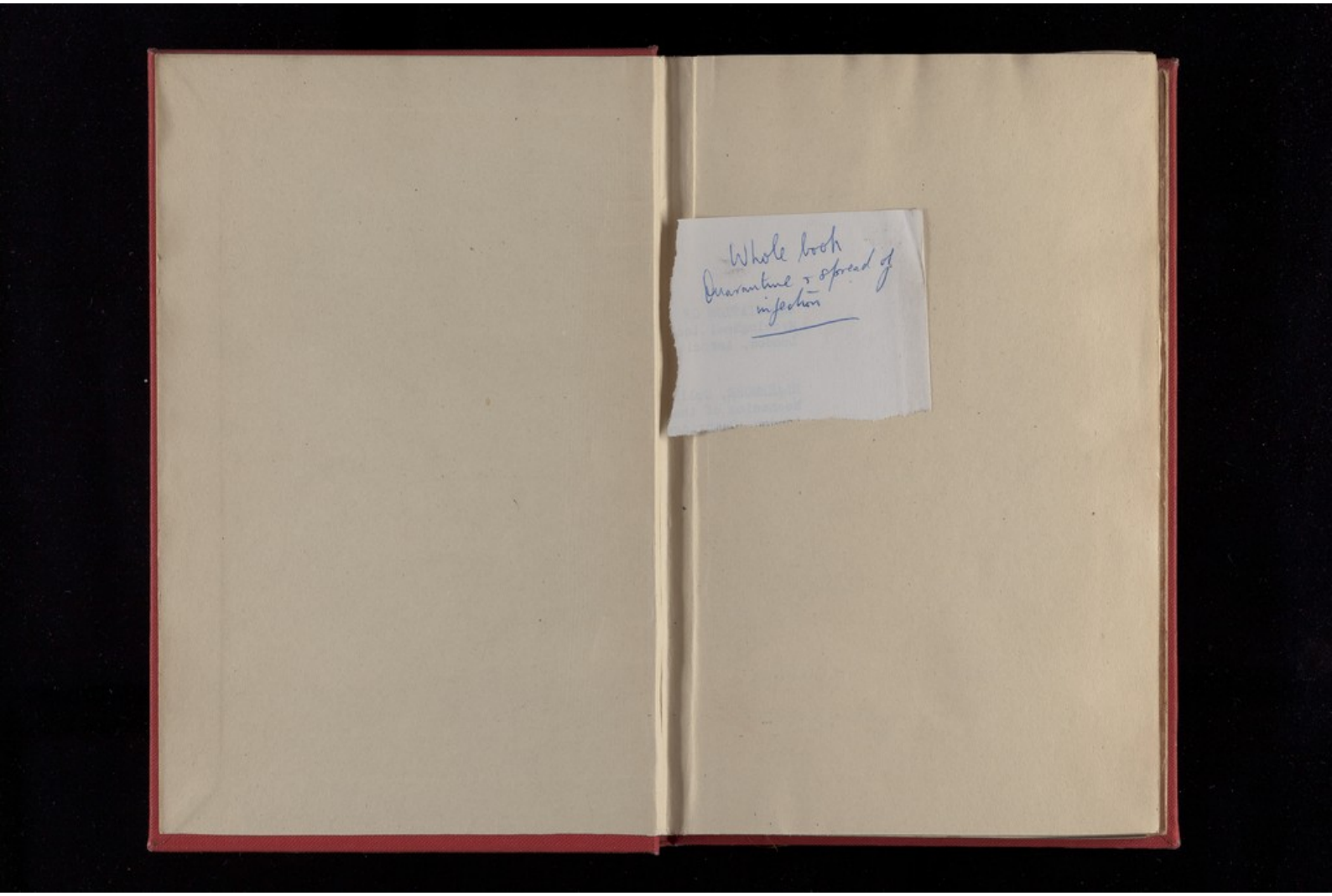
Whole book
Quarantine + spread of
infection

Contents

LONDON.

SAMUEL HIGHLEY, 32, FLEET STREET.

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AND
BAILLIERE, PARIS.

1846.

QUARANTINE AND THE PLAGUE:

BEING A SUMMARY OF

THE REPORT ON THESE SUBJECTS

RECENTLY ADDRESSED

To the Royal Academy of Medicine in France;

WITH

INTRODUCTORY OBSERVATIONS,

EXTRACTS FROM PARLIAMENTARY CORRESPONDENCE,

AND NOTES.

By GAVIN MILROY, M.D. &c.

LONDON:
SAMUEL HIGHLEY, 32, FLEET STREET.
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ADVERTISEMENT.

The Report, contained in the following pages, appeared in the last Number of the Medico-Chirurgical Review. But as the subject of the Quarantine Laws will, in all probability, be brought before the notice of the Legislature in the course of the ensuing Session of Parliament, Dr. Bowring having announced his intentions to that effect, it has occurred to me that the interesting and, on most occasions, very conclusive facts and reasonings adduced by the French Commission should be made as public as possible. To render them intelligible to all, and in the hope of disentangling the subject from many of the perplexities which have hitherto surrounded it, I have prefixed some introductory remarks on the proper meaning of such words as *Contagion, Infection, Endemic, Epidemic, &c.*

The Extracts from the Parliamentary Correspondence, printed in 1842 and in the course of the present year, will be found to contain much valuable information.

G. M.

30, Fitzroy Square,
October, 1846.

QUARANTINE AND THE PLAGUE,

&c. &c. &c.

It must surely be quite unnecessary to say a single word in the way of soliciting our readers' patient and most attentive consideration of the facts and reasonings, which we are about to bring under their notice. The subject of the Quarantine Laws is one of public and very urgent interest. All persons are more or less immediately concerned in their operation and effects; for whatever interferes with the free and unrestrained intercourse of one nation with another, cannot fail to affect the common welfare. To the medical man the subject is, as a matter of course, doubly and trebly interesting; some of the most curious and important questions, connected with the natural history of pestilential diseases, are involved in its right adjustment. It is to medical doctrines and to medical opinions that we owe the present system of prohibitory restrictions, which so seriously interfere with the social comforts and commercial success of numerous countries; and therefore for this reason alone, if there was no other, it well becomes the members of our profession to be foremost in making a calm and candid examination of those doctrines and opinions from which such grave consequences have followed. Now, every one who has made himself acquainted with the subject, be he physician or merchant, traveller or statesman, has of late years, without exception, come to the decided conviction that it is high time for a thorough revision and a very material modification of the Quarantine laws, such as they now exist, to take place. The absurdly foolish and most ridiculous principles which they embody, the vexatious and oppressive restrictions which they impose, the wretchedness and suffering which they almost necessarily give rise to, and the great increase of mortality which, we have reason to believe, they often occasion, are surely sufficient grounds for the scrutinizing investigation that is so generally demanded. For some years past, the Governments of England and of France have been using their best exertions to effect a change, and have been trying to get the various Continental powers to co-operate with them in their good work.

It is the object of the following pages to explain what has been done in both countries. But before we can enter upon this task with advantage, it will be advisable—we should rather say, it is absolutely necessary—to determine with precision the meaning of certain terms and expressions which are continually recurring in the examination of the question before us, and the very vagueness and obscurity of which have mainly contributed to the senseless discussions and very pernicious disputes that have so long retarded its solution.

In the French Report, which we shall presently have to analyse with great minuteness, the word *transmissible* is substituted for the more usual ones *contagious* or *infectious*, to denote such diseases as are capable of being transmitted or communicated from one person to another. The substitution is, in our opinion, a wise and useful one; as we shall now endeavour to shew by a few obvious and intelligible illustrations.

I. There are certain maladies which can only be transmitted or communicated, when either the diseased part in the sick person, or matter taken from it, is brought into immediate contact with the body of a person in health. To this order belong the Ringworm of the scalp, the Itch, Syphilis and Gonorrhœa, Cow-pox (in man at least), Hydrophobia or Rabies, &c. These maladies are incapable of contaminating the atmosphere; and persons, for aught that we know to the contrary, might remain for days and weeks in the company of patients affected with any one of them without the risk of catching the disease, provided all contact, direct or indirect, be cautiously avoided. It is to this order of diseases that the term *contagious*, *i. e.* communicable by *contact*, should be strictly limited.

But there is a distinction between the members of this order that requires to be kept in mind. In some, the mere contact of the morbid matter with the external surface of the body of a person in health is sufficient to produce the disease in the latter. Such is the case with the Ringworm and the Itch. In others, the matter must be applied either to the skin deprived of its epidermis by abrasion or incision, or else (what is nearly equivalent to this) to a mucous surface. There is no reason to believe that the virus of Cow-pox or even Hydrophobia would affect a person, if there be no injury of the skin of the part to which the poisonous matter is applied; in other words, unless it be *inoculated*; and we well know that the syphilitic and gonorrhœal poisons are inocuous, except when brought into contact with a mucous surface.

The distinction now alluded to is not without its practical bearings, as we shall see when we come to consider the mode or modes in which the Plague is said to be propagated. To say that inoculation is nothing more than mere contact would be about as rational as to assert that the process of grafting consists simply in applying the branch of one tree to the trunk of another.

II. The second order of transmissible or communicable diseases contains those which are propagated by the atmosphere, around a patient, becoming infected or contaminated by a peculiar effluvium or miasm which emanates from his body, and which being inhaled into the lungs—and admitted, it may be, at the same time into the stomach—of a person in health, has the property of inducing like symptoms in him. Here there is no palpable or substantial virus, as in the former case, that can be directly transferred from one individual to another, either by simple contact or yet by inoculation; at all events, the effluvium or morbific miasm is not appreciable by any of our senses. All that we know of it is from its effects; for we find that, when an individual in health remains for some time in the immediate neighbourhood of a patient labouring under such a disease, he is liable to become affected with it, although there has been no contact with, nor even any close approximation to, the sick person. Moreover, there is every reason to believe that the disease would never be communicated by mere contact with the patient's body, if it could be so arranged that the person, on whom such an experiment was made, did not inhale the contaminated atmosphere.

Hooping-cough and Scarlatina are examples of this order of communicable or transmissible diseases. They propagate themselves by *infecting* the atmosphere: hence they are properly called *infectious*, in contradistinction to the former order which are termed *contagious*. In the French Report, the expression "miasmatic infection" is generally used to designate this mode of transmission.

Some writers indeed, men too of acknowledged ability, have objected to the distinction now made between contagious and infectious diseases, on the ground that infection (in the sense we have used it) is nothing more than a mere variety, kind, or peculiar mode of contagion. In both sets of diseases, they say, there is the application of a morbific matter to the body of a person in health; the only marked difference being that, in the one case, the poison is cognisable by our senses, and, by being applied to one point of the body, in general excites the disease primarily in that spot; whereas, in the other case, it is diffused through the atmosphere and is imbibed into the system, over a much larger surface, by the lungs, and, it may be, also by the skin, and even by the stomach. In both cases, therefore, there is contact. Now we are not at all disposed to deny the logical accuracy of the objection; and, were the question before us one of mere theoretical or technical interest, we might be inclined to admit its validity. But, when we come to look at it in a practical point of view, and more especially to consider it in reference to measures of prophylactic treatment, we shall at once perceive the importance of distinguishing such diseases as are *simply and only contagious*, from those which are *simply and only infectious*. It is surely unnecessary to adduce examples to prove the truth of this remark. Suffice it to say that no prudent mother would be satisfied with the same precautions to prevent the spreading of Hooping-cough in her family as with those she used to prevent the spreading of Ringworm; and need we remind our readers how much cruel suffering, as well as vexatious annoyance and extortionate expence, might be annually spared, if the difference between infection and contagion were always recognised in the lazarettos for the Plague?

The miseries that have been so long, and still are, inflicted on thousands from the almost universal and exclusive adoption of the notion that the plague is transmissible by contact alone, are only to be equalled by the ridiculously absurd puerilities of which it has been the prolific source.

Before quitting the subject of *infectious* diseases, we must call the reader's attention for a few moments to a circumstance connected with

them, which has hitherto been far too much overlooked by most writers on this important theme of medical enquiry. It is simply this. Whenever a number of human beings, even in a state of health, are cooped together in a narrow ill-ventilated space, the air gradually becomes so contaminated by the effluvia given off from their bodies that, in the course of a more or less limited space of time, Fever will almost inevitably make its appearance among them; and this fever, so generated, will often be found to exhibit infectious properties, if the sick are not removed to a more airy and wholesome locality. Something of this sort was observed in the case of most of the 23 survivors of that dreadful night, when upwards of 140 human beings were shut up in the Black Hole at Calcutta. We have daily illustrations of the same fact in what takes place on board troop and slave ships, in jails, crowded penitentiaries, and so forth.

If such then be the case with persons in health, can we wonder that the effluvia from the bodies of the sick must be still more poisonous and contaminating? If any one has a doubt upon this score, let him walk from the open air into the ward of a hospital, when all the windows have been closed for a time; a sense of nausea and oppression, accompanied not unfrequently with actual shivering, are often immediately experienced.

Now it is in the way we have just mentioned that various maladies, which are certainly not primarily or essentially infectious, are apt to become so in impure and badly-ventilated situations, more especially when many sick are crowded together. The infectiousness is not a necessary quality of the disease; it is an accessory or contingent attribute. Various forms of low or typhoid Fever, Erysipelas, Dysentery, Angina, &c. may be mentioned as affording not unfrequent examples of the phenomenon in question. The consideration of this subject teaches us two important lessons. In the first place, it inculcates the imperious necessity of thorough cleanliness and free ventilation, wherever a multitude of sick persons are congregated together; and in the second, it exposes the absurdity of the disputes which have so often taken place about the infectiousness or non-infectiousness of several diseases. We shall have more than one opportunity of reverting to this topic as we proceed.

What has been observed in the case of human beings, holds equally true in that of the lower animals. Disease is always liable to break out among cattle, when they are crowded together in close and filthy sheds or covers. Some of the best writers on veterinary medicine have asserted that the mere detention of many horses together—especially when these are of an inferior breed, and their food is of bad quality—in stables that are foul and offensive, or on board ships, is in itself sufficient to engender the Glanders; a disease which, when once developed, is not only exceedingly apt to spread to other horses, but is even liable to infect human beings.

III. We have seen that some diseases are transmissible only by direct contact with the sick or with a palpable virus or poisonous matter derived from them, and others only by the atmosphere becoming infected with effluvia given off either directly from the bodies of the sick, or, it may be, from articles of dress, &c. which have become deeply impregnated with such effluvia. Now there are certain diseases that are capable of transmission in both of these ways. Small-pox is, as every one knows, of this number; so is

Measles, according to the views of many physicians; so is Hospital Gangrene; and so is Glanders in the horse. We might add two or three more to the list; but they are of more questionable authenticity. Might not the appellation of *contagio-infectious* be given to this order of transmissible diseases? If any more appropriate epithet, that will better indicate the two-fold mode of transmission, be proposed, we shall gladly make use of it.

It deserves to be noticed that, in all *contagio-infectious* maladies that we are well acquainted with, the simple contact of the morbid matter with the uninjured cutaneous surface is not sufficient to communicate the disease; the matter must either be inoculated, or else be applied to a mucous surface, for its contagious effects to be produced.

These few remarks on the modes in which certain orders of diseases are transmissible from one person to another, we earnestly recommend to the reader's considerate attention; otherwise he might not be able to judge aright of some of the most important questions, connected with the propagation of the Plague, to be shortly brought under his notice. All that we shall say at the present moment respecting this hitherto ill-understood disease is, that it has been declared by one—and by far the most numerous—party to be *contagious;* by a second party, to be *infectious* but not *contagious;* and, by a third party, to be *contagio-infectious*. The solution of this question is the paramount object of our enquiries; but, before we proceed further, there are two or three other terms that require a brief explanation.

Those diseases are called Endemic (ἐν *in*, and δῆμος *a people*), which are in a great measure limited to certain localities, and are attributable to peculiarities of soil and atmosphere, or of the food, habits, &c. of the people in these localities. Ague is endemic in Lincolnshire and other marshy countries; Remittent Fevers and Dysentery in all tropical regions, near swamps and rivers; the Plague is endemic in Egypt, and the Yellow Fever on the West Coast of Africa; Typhus in the filthy and crowded parts of all large cities; Bronchocele in Derbyshire, and Cretinism in some of the valleys of the Alps; Pellagra in Lombardy, and Elephantiasis in Barbadoes. We might adduce many other examples; but these are sufficient to give an idea of what is meant by the term endemic. "Indigenous," and "of spontaneous growth or development," occasionally used in the following pages, are equivalent expressions.

As endemic diseases are owing to the operation of more or less permanently existing local causes, it must be obvious that it is only by a patient being withdrawn, at a sufficiently early period, from the sphere of such operation that he can rationally hope to be cured. If he persist to remain in the offending locality, his malady will inevitably be aggravated. Change of residence, therefore, is the *sine qua non* in the successful treatment of almost all endemic diseases. For the same reason, if the local causes themselves be gradually removed, this order of diseases ceases to be generated. Thus many districts, that used to be the seat of intermittent fevers, have been in course of time rendered quite healthy by efficient draining. Such has been the case about Lambeth and some parts of Westminster—the neighbourhood of the Marsh-gate, for example. In short, the prevalence and severity of endemic diseases are generally inversely proportionate to the

territorial improvement of a country, and to the increased civilization and social comforts of its inhabitants.

The term "Epidemic" (επι *upon*, and δημος *a people*) is used to designate those diseases which prevail for a limited period, and generally at particular seasons, over a wide extent of country and often attack a large number of the inhabitants at the same time, then subsiding of their own accord until they entirely cease for the season. The causes of the appearance and disappearance of epidemics are little, if at all, understood. Some epidemics are of the endemic class of maladies, such as Typhus, Yellow Fever, and the Plague; others are not, but of more universal development, such as Small-pox, Measles, and the other Exanthemata. Their outbreak is often sudden and widely extended, spreading alarm and desolation around; they are then called *pestilences*. A pestilence may be transmissible; but it is not necessarily so. At all events, its diffusion is obviously not dependent upon such a slow and gradual process as infection or contagion. It does not creep from person to person in its onward course, but it seems to travel on the wings of the wind. Hence we read in Scripture of "the pestilence that walketh by noon-day and the arrow that flieth by night:"—how beautiful and how true; it walketh by the day, but it flieth by night; for its attacks are then always the most numerous and the most severe. Every one knows the fine description which Homer has given of the nine-days' pestilence in the Grecian camp, when the arrows of the angry God (νυκτι' εοικως "gloomy as night") spread havoc among man and beast.*

Not less expressive is the image employed by the noble poet in his famous lines on the destruction of the host of Sennacherib, when

> "The angel of death spread his wings on the blast,
> And breathed in the face of the foe as he passed."

An old man in Persia said to Dr. Lacheze, who was questioning him about the plague, and its mode of diffusion, that it will often break out in spite of the most complete isolation; "for," added he, "the disease may light upon a house as a bird lights upon the branch of a tree." Most true; we know not whence the secret foe cometh; it is like the wind, it bloweth where it listeth.

The ancient physicians very properly confessed their ignorance of the cause of Epidemic diseases; they recognised a something mysterious—το θειον, *quid divinum*—in them which they could not fathom. All that we can say is that, in some years and seasons, the atmosphere appears to become charged with a noxious influence, causing or promoting the diffusion of certain diseases, which, in other years and in other seasons, are *sporadic*, *i. e.* sparse, scattered, or which only occur here and there. This occult

* The late dreadful invasion of epidemic Cholera at Kurrachee in Scinde appears not to have lasted more than ten or twelve days; within that short space of time, it swept off upwards of 8000 human beings! The disease broke out at night. Altogether, this invasion exhibited the characters of a pestilential visitation in as pure and marked a degree as any of which we ever read. After its murderous ten-days sojourn at Kurrachee, it is described as travelling up along the course of the Indus towards Hydrabad.

state of the atmosphere is technically called an "epidemic or pestilential constitution," and the locality where it prevails is said to be an "epidemic or pestilential focus," or a "focus of pestilential infection." As these terms occur frequently in the following pages, it is necessary that their meaning be well understood.

Notwithstanding that Epidemic diseases are not, like Endemic, dependent for their origin upon local causes, it must be borne in mind that their malignancy, and perhaps their duration also, are almost invariably much influenced by the general salubrity of a place, and by the condition and habits of its inhabitants. The low-lying districts of a town or country suffer worse than the more airy and elevated; and we need scarcely add that the ill-fed poor, living in filth and wretchedness, are always the chief victims. It is under such unfavourable circumstances that all epidemic diseases, whether they be essentially and primarily infectious or not, invariably appear to be readily transmitted from one person to another. We shall afterwards see how difficult it is, on many occasions, to come to an accurate decision upon this point; but of one thing we are pretty well assured, from the concurring testimony of the best observers, that the transmission of a disease can do but little harm upon a great scale, unless aided not only by a pestilential condition of the air, but also by local causes of insalubrity. It is to the correction of the last-named adjuvants that the attention of statesmen and legislators should be mainly directed, under the sober guidance of enlightened physicians.

Epidemic diseases are not confined to the human race; they are exceedingly common among brutes, and are then called Epizoics or Epizootics (επι *upon*, and ζωον *an animal*); in common parlance, *murrains*. Epizoics often precede or accompany the existence of Epidemics among man.

The vegetable world also is not exempt from pestilential invasions, too well known as *blights*. The potatoe-disease, so widely spread and so destructive at the present time, is in all respects a Vegetable Epidemic. We need scarcely say that we are quite as ignorant of the cause of this as of most other like visitations. Is it of insectile origin? Many circumstances seem to render this idea not improbable.*

After these preliminary observations, we shall now proceed to notice very briefly some points in the literary history of the Plague during the last ten years or so, with the view of pointing out the changes of opinion that have taken place in the minds of many medical men and others on the important questions connected with its mode of propagation.

It is only since the year 1835, when Egypt was visited by one of the most fatal outbreaks of epidemic plague on record, that the real and intimate nature of the disease has been thoroughly known. Before that time, there was so much of mere conjecture and idle tradition mixed up with its history, that we cannot with any confidence build upon the accuracy of the

* Dr. Grassi, so long resident in Egypt and other Eastern countries, and who has had such ample experience of the Plague, maintains that this and indeed many other transmissible diseases, are of insect origin;—*é molto probabile che la cagione produttrice di una malattia contagiosa consista in una specifica sostanza organizzata, la quale sia capace di mantenersi et di riprodursi seconde le leggi comuni di tutti gli esseri dotati di vita.*

data that are found in the narrations of preceding writers. Most of them seem to have looked for corroboration of already adopted opinions in the cases which came under their notice, and not to have examined the actual phenomena of the cases themselves to teach them what opinions they should hold. Hence the comparative unprofitableness of most of the works on the Plague published before 1835. Then it was that the entire subject of its history was examined *de novo*, all the materials connected with it stirred up, so to speak, from the bottom, and subjected to a most sifting investigation, while nothing was assumed or taken for granted upon hearsay evidence or partial enquiry. The evidence that has been made public by that noble band of devoted Frenchmen, of whose labours we shall presently speak at large, and of our own countrymen, Drs. Laidlaw and Abbott, is infinitely more useful than the labours of all previous writers. But, not among medical men only have sounder views prevailed on the subject of the plague since 1835; the consular agents, ambassadors, and ministers of this country and of France have also largely partaken of the same advancing enlightenment. It is indeed most gratifying to read the official correspondence of public men in both countries upon this subject. While in Italy, within the last eight or ten years, bars of iron have been actually passed through the fire to destroy the contagion adhering to them, and vessels from Great Britain have been subjected to a quarantine at Messina in consequence of a report in a French newspaper that typhus fever existed in Glasgow; while a quarantine of 42 days has been instituted in more than one country against the invasion of East India Cholera, and a cargo of New Orleans cotton, that had been landed and re-shipped at Liverpool, has been declared at Copenhagen infected after another fortnight's voyage—while these and many such-like things have been acted over and over again in different European ports during the last few years, it is nevertheless equally true that men of education everywhere have begun to feel the urgent necessity of putting an end to such absurdities. The credit of taking the lead in this much needed reform is equally shared by France and this country.

In 1838, a proposal was made by the French to the British Government to promote the formation of a general Congress of Delegates from the various European states having ports in the Mediterranean, for the purpose of agreeing upon some uniform system of Quarantine regulations to be adopted by all. Our Government at once acceded to the proposal. Austria also, which had been applied to by France at the same time, intimated at first her assent to its general principles and substance, only with some modifications in the details. Difficulties, however, were subsequently started; and the result was, most unfortunately, that the matter dropped entirely for the next four or five years.

In the course of the same year (1838), and indeed anterior to the date of the proposal of the French Government, we find that Mr. Lewis, one of Her Majesty's commissioners for enquiring into the affairs of Malta, in a very able document respecting Quarantine regulations in the Mediterranean, after expressly asserting that "it is notorious that the mode or modes in which plague is communicated are very imperfectly known, and that some of the maxims, on which the most important Quarantine regulations rest, are little better than gratuitous hypotheses," suggested that two or

more medical men should be sent out by the British Government to visit all those ports of the Levant where the plague most frequently exists, with the view of collecting ample and authentic information upon the mode or modes in which it is propagated or liable to be communicated. He suggested at the same time that France and Austria should be invited to join with us in this enquiry.

When Mr. Lewis' views were submitted by Government to Sir William Pym, our Superintendent-general of Quarantine, for his opinion, he, with sound judgment, we think, proposed that, instead of sending out physicians from this country, "copies of Mr. Lewis's queries should be forwarded to the different consuls at Constantinople, Smyrna, Aleppo, Alexandria, Cairo, and Odessa, to which might be added Marseilles and Malta, requesting them to submit them to the different European physicians, and to obtain from them replies and observations, which might be forwarded to the Quarantine Congress expected to assemble in the course of the present year" (1839).

Sir William's suggestion was acted upon; and the following queries, modified somewhat from those originally proposed by Mr. Lewis, were drawn up for the occasion:

1. Is plague communicated by contagion?
2. Is plague communicated by contagion alone, or by other means also; and, if so, by what means?
3. Is actual contact with an infected person necessary for communicating plague, or will a close approach to such person communicate the disease?
4. Can substances which have been in contact with an infected person communicate the plague, and, if so, what substances?
5. How long may the infection of plague remain dormant in an infected person, before it declares itself by evident symptoms?
6. How long will the contagious matter of plague, when lodged in inanimate substances, retain its infecting power?
7. What are the means by which substances, containing the contagious matter of plague, may be purified?

The replies furnished to these queries by different medical men in Egypt and elsewhere, more especially those of Clot-Bey, Dr. Laidlaw, and Dr. Grassi, are replete with the most valuable information. Frequent reference will be made to them in the following pages.

Here we must not omit to draw notice to a brief dispatch addressed by Lord Palmerston in February 1839 (before the above replies were received) to Lord Ponsonby, our Ambassador at Constantinople, on certain harsh quarantine measures about to be enacted in Turkey; it is full of the soundest medical wisdom:—

"With reference to the proposed regulations, I have to instruct your Excellency to endeavour strongly to impress upon the Turkish Government that they would more effectually prevent the breaking out and spreading of the plague, by introducing cleanliness and ventilation in the city and suburbs of Constantinople, than by any such violent interference as is proposed with the domestic arrangements of families.

"It is quite certain that the plague is much aggravated, if it is not actually generated, by the want of cleanliness in streets, by the want of sufficient ventila-

tion in houses, and by the want of proper drainage in places contiguous to habitations; and, if the Turkish government would, in the first instance, apply vigorous measures to correct these evils, they would strike at once at the causes of the disease; whereas the measures, which they have now in contemplation, will only be productive of inconvenience and suffering to numerous individuals."

In 1841, Dr. Robertson, deputy-inspector of hospitals and serving with the British troops in Syria, thus expresses himself in his official report to Government on the Plague:—

"In reference to the contagious or non-contagious* nature of this at times frightful disease, I beg to state that the result of all my experience leads me to believe that the disease originates in local causes, and that it is endemic in Syria and Egypt; that it is not of a highly contagious nature; and that, if ever so at all, some other concurrent circumstances are necessary to render it so. Extreme and exclusive opinions on the doctrine of contagion are hardly warranted by the present state of our knowledge. My own firm conviction is that the plague cannot be communicated from one person to another in a pure atmosphere, even by contact; but I am not prepared to assert that, if plague-patients are crowded together in confined and ill-ventilated apartments, infection will not be produced, just as happens in Typhus fever."

Mr. Brant, our consul at Erzeroum, writing about the same period respecting the then recent severe outbreak of the plague there, says:—

"As far as my own experience goes, I have been led to doubt the contagious nature of the disease, as it showed itself here last Summer; or, if it were contagious, it must have been in a very slight degree. I have had, within the sphere of my observation, many cases of the most complete and extensive contact, without the disease being communicated."

Mr. Sandison also, our consul at Brussa, informs us that "the cases are numerous in which persons escape the disease after contact with persons seized with it, even in its most malignant stage. There are frequent instances also of individuals being attacked by the plague, without being at all able to trace communication with any infected person or substance."

Influenced no doubt by these and other similar statements, Lord Aberdeen, following in the same path of enlightened policy with his predecessor, endeavoured in 1843 to bring about the establishment of the proposed general Congress which, to the great regret of every humane and liberally-minded statesman in Europe, had never yet taken place. The French Government readily acquiesced in his views; but the Austrian, while professing their readiness to co-operate, considered that the holding of any conference or congress would be premature, until exact information was procured from competent medical men upon the following three points:—

1. The minimum and maximum of the terms of quarantine to be fixed upon for persons.
2. The terms of quarantine necessary for goods and merchandize.
3. The best measures to be adopted for the disinfection of objects that are susceptible of contagion.

* These words are used here in the sense of "transmissible" and "non-transmissible."—G. M.

To recognise the settlement of these points to be a necessary preliminary to any satisfactory adjustment of the question of Quarantine, is obviously to take for granted that the disease, to which they refer, is one that is transmissible not only by persons, but also by goods, under all circumstances and at all times; a position that few unprejudiced men in the present day are likely to maintain. As a matter of course, the British and French governments, unable to act independently, were obliged to give in to the lagging policy of the Empire; Prince Metternich having intimated that six months at least would be required to obtain the information which he deemed necessary. But neither France nor England has meanwhile been idle in the good cause of Quarantine reform, resolved that all just or alleged causes of delay should be removed as promptly as possible. The former summoned her enlightened Institute to her aid, and the latter dispatched Sir William Pym to visit all the lazarettos and quarantine establishments in the Mediterranean. It is to the important information derived from these two quarters that we now solicit our reader's most serious attention.

In August 1844, the Royal Academy of Medicine in France appointed a Commission to examine all the varied questions connected with the Plague and with Quarantines. This Commission was composed of the following members—men, we may remark, of the highest professional and scientific attainments—MM. Adelon, Begin, Dubois (d'Amiens), Dupuy, Ferrus, Londe, Melier, Pariset, Poiseuille, Prus, and Royer-Collard. M. Ferrus was named the president, and M. Prus the secretary and reporter. The Commissioners were engaged in their deliberations for upwards of twelve months, and had every facility granted them by the French government, to render their enquiry as complete and as accurate as possible. At length, the report was drawn up and read at the sittings of the Academy, on the 5th, 10th, 17th, and 24th of March and the 5th of May of the present year. It is certainly a very elaborate and instructive work, replete with most valuable facts and data, which cannot fail to be truly acceptable to every enquirer upon the great questions under consideration, whether he admits the soundness of the conclusions adopted by the majority of the Commission or not.

Although the Plague has so often ravaged the world and there has been no lack, as a matter of course, of books and memoirs published at different times upon the subject, it must be confessed that the number of instructive and really accurate narratives of well-observed *facts* is by no means very considerable. The epidemics, of which we have the most trustworthy histories, are the following:—that of Nimeguen in 1635, described by Diemerbrock; that of London in 1665, described by Sydenham and Hodges; that of Marseilles in 1720, by Chicoyneau, Verney, Deidier and Bertrand; that of Transylvania in 1755, by Chenot; that of Moscow in 1771, by Mertens, Orrœus, and Samoilowitz; and those of Egypt in 1798, 1799 and 1800, which have been so well described in the writings of Desgenettes, Larrey, Pugnet, and Louis Frank.

But, however valuable the records of the epidemics now mentioned may be, it must be admitted by all who have attentively studied the history of the plague, that it is only within the last ten or twelve years (as

already remarked) that we have anything like a positive and truly scientific acquaintance with the disease.

Dr. Aubert-Roche was the first to display that brave and generous devotion to humanity and science, which has since been followed by so many of his professional brethren, when he devoted himself to wait for thirty-six hours unceasingly, and without taking any precaution, upon his friend Dr. Fourcade, who died of the plague at Cairo on the 20th of February, 1835.

Shortly afterwards, numerous plague patients were received into the hospital of Esbekiè, at Cairo. Clot-Bey, anxious to give the most complete authenticity to the observations which might be made of these cases, proposed to MM. Gaetani, Lacheze, and Bulard to join with him in forming a committee or board for the purpose of attending together upon all the patients in the successive stages of the disease, and of making *post-mortem* examinations. These four gentlemen carried through this task with the greatest zeal and devotedness. The infected were waited upon like other patients; they were freely touched whenever there was occasion to do anything for their relief, or for the investigation of their symptoms. The bodies of those who died were taken to the dissecting amphitheatre, and every organ was most attentively inspected. The results of each visit in common were carefully reported in a register, and each report was regularly signed by all four. This register (which was submitted to the perusal of the government Commission) is the chief basis of the works, which have been published by Clot-Bey* and Bulard.

Subsequently to these researches, the professors of the medical school at Abouzabel (about four leagues from Cairo) personally attended upon 140 plague-patients, of whom 38 died. Professor Perron has communicated a report of the observations and *post-mortem* examinations then made, in a memoir which he addressed to the Academy.

Drs. Aubert-Roche and Rigaud, attached to the great hospital at Alexandria, displayed no less courage and disinterestedness in their enquiries. The latter gentleman died of the plague, leaving behind him an account of 68 dissections which he had made of fatal cases.† The former has published an account of his observations, collected either by himself or in conjunction with his lamented colleague.‡

The conduct of M. Lesseps, the French consul-general at Alexandria, has been the theme of universal admiration. By his own example, he powerfully contributed to dissipate the exaggerated apprehensions of visiting and even

* This indefatigable person has sent no fewer than 50 memoirs, at different times, on the subject of the plague to the French Academy. Many of these memoirs, written by able men who have had ample opportunities of studying the disease, well deserve to be published.

† In the very valuable pamphlet on Oriental Plague and Quarantines, published by Dr. Bowring in 1838, it is stated that Dr. Rigaud, after having been, during the most fearful crisis of the pestilence (1835), constantly engaged in visiting and assisting the living or in dissecting the dead, at length fell a sacrifice "just as the plague was ceasing, when its violence appeared wholly exhausted, and the season of its disappearance was about to arrive."

‡ De la peste et du typhus d'Orient. Paris 1840.

touching plague-patients. His conduct towards Dr. Rigaud, up to the last moment of his friend's life, was a memorable instance of noble generosity.*

Since 1835, the medical men resident in Egypt have continued their efforts to render our knowledge of the plague more and more complete. In 1837, an epidemic broke out at Adana, in the corps of the Egyptian army that then occupied Syria. In 1841, Damietta, Cairo, and a number of the towns or villages in the Delta were visited by the pestilence. It is also to be remembered that not a year has passed since the great epidemic of 1835, without a greater or less number of sporadic cases occurring every now and then in different parts of Lower Egypt.

But the plague has been studied of recent years in other countries besides Egypt. To confine our notice to modern works only, we may mention Dr. Brayer's *Neuf années à Constantinople*; Dr. Gosse's account of the plague in Greece during 1828 and 1829; and the reports of Dr. Morea on the plague of Noja in 1817, and of M. Hemso on that of Morocco in 1818.

M. de Segur du Peyron, although not a physician, has rendered great services to medicine by the publication of the three reports which he addressed, in the years 1834, 1839, and 1846, to the Minister of Commerce, and which contain a great mass of observations collected by him in the principal ports of the Mediterranean.

Lastly, the Academy has received a memoir on the plague and quarantine, published in 1845 by Dr. Moulon, physician of the lazaretto at Trieste; and also a printed report on the transmission of the plague and the yellow-fever, that was drawn up by a committee of the medical society of Marseilles, and unanimously approved of and adopted in August 1845.

Besides the published works above enumerated, a number of very valuable manuscript documents have been submitted to the examination of the Commissioners.

Among these, we may mention the original papers respecting all the cases of plague that have occurred in the lazaretto of Marseilles since 1720, along with a letter and memoir from Dr. Robert, one of the physicians of this lazaretto;—the register kept in Egypt and Syria, during the years 1828, 1829 and 1830, by the plague commission, of which M. Pariset was the president;—the report, addressed in 1842 to the minister of commerce, by Dr. Delaporte of his mission to Constantinople, Smyrna, and Alexandria, for the purpose of studying the plague in these places;—a statistical statement of 506 epidemics of the plague drawn up by Dr. Rossi of Cairo, who, like Dr. Delaporte, nearly fell a sacrifice to an attack of the pestilence;—the statistic report of all the cases of plague observed in the lazaretto of Alexandria since 1835, by Dr. Grassi, who has been physician of that establishment since 1831;—a memoir on the plague in Persia by Dr. Lacheze;—one on the plague in Algeria, from the year 1552 down to 1819, by M. Berbrugger, corresponding member of the Institute, and conservator of the library and museum of Algiers;—a memoir on the contagiousness of the

* Equally praiseworthy has been the conduct of Mr. Thurburn, the British Consul at Alexandria. His letter to the Board of Health in that city in 1838 is an admirable performance, characterised not less by generous humanity than by the bold enunciation of enlightened views.—G. M.

plague by MM. Pezzoni, Leval, and Marchand, members of the council of health of the Ottoman empire, dated June 1842;—and lastly, a memoir on the antiquity and endemicity of the plague in the East, and especially in Egypt, by Dr. Daremberg, the learned librarian of the French Academy.

In addition to these numerous sources of information, the Minister of Foreign Affairs granted to M. Prus the privilege of consulting the dispatches of the French ambassadors and consuls in the Levant on all topics connected with his enquiries. The dispatches of M. Lesseps, (to whom we have already alluded,) during the frightful epidemic of 1835 in Egypt, were found to be especially valuable. The Minister of Marine also put all the official documents under his control at the free disposal of the Commissioners.

With the view of rendering their enquiry as complete and comprehensive as possible, the Commissioners invited to their meetings the attendance of medical men and others, who might feel inclined to give any verbal communication. In this way, they received much valuable and interesting matter.

The Report is divided into four parts or sections.

In the *first*, the following points are examined and determined:—the countries where the plague has been observed to become spontaneously developed;—the causes of spontaneous plague;—the disappearance of the plague, whenever these causes have ceased to exist;—the countries where the persistence of these causes renders the plague endemic, or at least makes the return of the spontaneous disease to be apprehended—and, lastly, the measures that are really and truly prophylactic against spontaneous plague.

In the *second* part, the three following questions are answered:—1. Has the plague always exhibited the characteristic features of epidemic diseases, whenever it has raged in Africa, Asia, and Europe? 2. What are the distinctive characters between epidemic and sporadic plague? 3. Does the plague spread after the manner of epidemic diseases; *i. e.* by the migration of certain atmospheric influences, and independently of the agency of those persons who are infected by it?

In the *third* part, the important question as to the transmissibility of the plague from one individual to another is examined. Is the disease transmissible by inoculation? Is it transmissible away from, as well as in, epidemic *foci* by immediate contact with the sick? by the contact of clothes, furniture, or merchandize? or by miasms exhaled from the bodies of the sick, and diffused through the atmosphere? This part closes with an examination of the following three questions. 1. Can persons affected with sporadic plague occasion *foci* of infection sufficiently active for the transmission of the disease? 2. Is the plague more or less readily transmissible, in proportion to the intensity of the epidemic; according as the disease is in its first, its second, or its third period; and, lastly, according to the organic susceptibilities of those who are exposed to the action of the pestilential miasm? 3. If the plague be transmissible away from epidemic *foci*, are there any grounds to apprehend that the importation of a few cases into France might occasion a pestilential epidemic?

In the *fourth* and last part, the question as to the ordinary or exceptional duration of the incubation of the plague is discussed. The general conclusions of the Report, and the application of these conclusions to the important subject of Quarantine are appended to this part.

First Part.

Chap. I.—*What is the country, or what are the countries, where the Plague has been observed to arise spontaneously?*

In attempting to trace back the history of the plague, with the view of throwing some light upon this question, it would be little profitable to carry our researches beyond the sixth century of the Christian æra, as there is too good reason to believe that the terms λοιμος and *pestis* were previously used in a generic sense, to denote all epidemic diseases which caused great mortality. The "boils breaking forth with blains upon man and beast," recorded by Moses, need scarcely be alluded to. The famous plague of Athens, so graphically described by Thucydides, is supposed by the best authorities to have been a malignant form of typhus, complicated with a peculiar eruption and with gangrenous eschars. The Greek historian says that it was believed in his day that the pestilence had been imported from Egypt into the Piræus.

Whether we are to admit the genuineness of the passage from Rufus of Ephesus, a celebrated physician in the time of Trajan—discovered by Cardinal Angelo Mai at Rome, in 1831, in the writings of Oribasius, who lived in the time of the Emperor Julian—is doubted by some learned enquirers; by M. Pariset, the accomplished secretary of the Academy, among the number. The passage indeed contains a remarkably accurate description of the characteristic symptoms of the plague,* and the writer refers to epidemics of the disease in Egypt, Syria, and Libya, mentioned by Dioscorides, Posidonius, and Dionysius, who (are supposed to have) lived two or three centuries before the Christian æra. It may be worthy of notice here that the writings of Cicero, Strabo, and Pliny afford evidence that Egypt was regarded, in their time, as a country that was fertile in the plague. There are allusions too in the works of Galen and Aretæus, not to mention Hippocrates, that would seem to indicate their acquaintance with malignant fevers accompanied with bubos and carbuncles.

But, without dwelling longer on the uncertain history of the plague, we shall at once come down to the year 542 of the Christian æra, when that terrible epidemic, the description of which by Procopius and Evagrius can leave no doubt as to the true nature of the disease, ravaged the city of Constantinople. From this period, the appellation has been very generally restricted to that form of fever which is accompanied with bubos,

* The following is one of several paragraphs that might be quoted:—

"A pestilential carbuncle is that which is accompanied with a severe inflammation, with acute pain, and delirium. In many of those who are affected with it, there occur also hard and painful bubos, and the patients soon die of these carbuncles. This is the case more especially with those who live in the neighbourhood of marshes."

carbuncles, and petechiæ. If we are to believe that from the 6th to the 16th century the term "plague" has been properly applied, we are surely justified in assuming that, from the beginning of the 16th century—that is to say, subsequently to the establishment of lazarettos in Europe—this word has only been employed in its right acceptation.

In the 16th century, there was (as far as we know) but one epidemic of plague in Egypt, and we find no mention of any in Turkey in Asia, or in Syria; whereas, in the course of this century, there were no fewer than fourteen invasions of the pestilence in France, twelve in Germany, eleven in Italy, nine in Dalmatia, six in Turkey (in Europe), five in England, five in Spain, two in Portugal, two in Poland, two in Belgium, and one in Switzerland.

In the 17th century, we have the account of but two invasions in Egypt, and of not one in Turkey (in Asia) or in Syria; whereas there were nineteen in Germany, eleven in Italy, eleven in France, six in England, five in Russia, four in Turkey (in Europe), three in Spain, two in Holland, two in Switzerland, two in Denmark, one in Sweden and one in Poland.

It seems, therefore, impossible that any one, who will take the trouble of comparing these figures (always supposing that they can be depended upon—G. M.) should not be struck with this remarkable circumstance; to wit, that the plague has repeatedly and most destructively made its appearance in many points or localities in the world, more especially in Europe, at various epochs when either it did not exist, or was only very rare, in Egypt. If such has been the case, we are surely bound to admit that the disease has often arisen spontaneously in other countries, besides Egypt, Turkey, and Syria. This is the view which M. Littré has taken; for he observes (article *Peste* in the Dictionnaire de Medecine) that "the plague was very frequent in Europe during the 16th and 17th centuries. Italy, France, England, Holland and Germany were attacked by this pestilence; and Paris and London witnessed it spring up in the midst of them just as Cairo and Constantinople now do."

In the 18th century, epidemic plague occurred nineteen times in Egypt, seven times in Turkey in Europe, four times in Dalmatia, four times in Germany, thrice in Russia, thrice in Spain, twice in Poland, twice in Greece, once in Italy, once in Sweden, and once in France, viz. when Provence and Marseilles suffered so severely in the years 1720 and 1721.

In the course of the present century, the epidemic plague has broken out eight times in Egypt, six times in Turkey in Europe, thrice in Greece, twice in Syria, twice in Italy, twice in Russia, once in Turkey in Asia, once in Germany, once in Dalmatia, and once in Morocco.

The statistical data which we have given, more especially those which have reference to the 16th and 17th centuries, appear to prove most incontrovertibly that the plague has arisen spontaneously, at certain periods, in very many of the countries of Europe and Asia. Our convictions upon this point will be much strengthened, if they are found to be supported by facts observed in our own day.

Dr. Lacheze, in the account of his recent travels through Persia, informs us that the plague has been repeatedly observed to arise spontaneously in several of the cities of Asia Minor, and particularly at Erzeroum, situated near the northern source of the Euphrates and about five days' journey from

Trebisond; a statement which has been amply confirmed by the report of the Turkish council of health, that was established in the year 1838. The same remark may be made respecting Aleppo.

There are numerous facts also that seem to prove that the plague is apt to appear spontaneously upon the banks of the Danube, as it does on those of the Nile and the Euphrates.

The Russian army in 1828, while engaged in war with the Turks in Moldavia, Wallachia and Bulgaria, was attacked with a very malignant fever that was accompanied with bubos in the groins and axillæ. Dr. Witt, principal physician of this army, while he has acknowledged that the fever resembled in every respect the true plague, gave it, however, as his opinion that it must be distinguished from this disease, because it arose on the banks of the Danube, independently of any importation from abroad! Dr. Schlegel, who had been sent by the Russian government, before the arrival of Dr. Witt in Wallachia, to determine the nature of the epidemic, admitted that, although it shewed great affinity to the plague, it differed from the latter in being attributable in that country to putrid emanations containing mephitic gas! On the other hand, Professor Seidlitz of Petersburg did not hesitate to regard the fever as genuine oriental plague.* If it was really so—and surely there is no good reason to think otherwise—we have the authority of both Dr. Witt and Dr. Schlegel that the disease was truly endemic and of spontaneous origin in the localities where it prevailed.

Although the plague may therefore arise spontaneously in a number of different localities, it is no doubt true that, in recent times, Egypt, Syria, and Constantinople—more especially the first—have been the principal *foci* of the disease. It is right here to mention that, since the year 1839, it appears that there has been no case of plague observed in Constantinople. The board of health of that city attributes this exemption altogether to the quarantine measures, that have been adopted of late years. May such be the truth! but let it not be forgotten that, before the terrible epidemic of 1812, not one case of the disease had occurred in that immense city for eight years;—a fact that is proved by the registers of the French embassy at the Sublime Porte.

Syria also appears, according to the testimony of Mr. Lander the English Consul at the Dardanelles, and of M. Beclard the French Consul at Smyrna, to have been completely exempt from the plague since the same period (1839). Dr. Lasperanza, attached to the Constantinople board of health, informs us that, in consequence of various sanitary improvements that have of late years been introduced, the disease has ceased to be endemic in Jaffa, as well as in other parts of Syria. In the present day, it is almost exclusively from Egypt that the importation of the plague may be apprehended.

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* This gentleman has shewn that, whenever in times past the Russians have carried on war against the Turks on the banks of the Danube and on the coast of the Black Sea, their armies have almost invariably suffered from the plague. In consequence of this fact, and other considerations to be afterwards mentioned, he does not hesitate to affirm that, in these cases, the plague is to be viewed as only the worst form of the endemic fever of the country.

The general *conclusion* from all that has now been stated is that—

"The plague has been observed to arise spontaneously, not only in Egypt, Syria, and Turkey, but also in many other countries of Africa, Asia and Europe."

CHAP. II.—*In countries where the spontaneous plague has been observed, can the development of the disease be reasonably attributed to any determinate hygienic conditions?*

To solve this question, the Commissioners examined with great care the history of the various localities in which the plague has arisen spontaneously, within the last fifty years. And first with respect to Egypt. Now the most competent observers assure us that there is nothing in the mere climate of this rich, and, in many respects, highly-favoured country that will account for the generation of the pestilence; indeed, travellers have written in the most glowing terms of its beauty and salubrity. The year in Egypt may be divided into three periods or seasons. The *first* commences in August and ends with October; it is the period of the inundation of the Nile. The *second* comprises the next six months, from November to April; it is the season of the winter harvests, the ground being covered with trefoil, wheat, barley, flax, &c. The *third* begins in May, and terminates in August or September; it is the time for the cultivation of cotton, indigo, and rice. As we have already said, the natural climate of Egypt is on the whole a very salubrious one. Its drawbacks are but few; the chief being the coolness and humidity of the nights, the frequent and rapid variations of temperature in the day, the rains and fogs of the Delta during the winter months, the great heat and excessive dust in summer, and, lastly, the singular effects of the South wind, the *Kamsin*, upon the living body. Whence then comes the pestiferous atmosphere of some parts of this land? The answer is ready; man himself has given it birth; the inhabitant of the Delta, says M. Hamont* who long resided in Egypt, has prepared the causes of his own destruction. The destitution, filth, and misery of the poor inhabitants are extreme. Their wretched hovels are so horribly disgusting as almost to defy description; they are not only surrounded by, but are actually receptacles of, heaps of ordure and putrid matters. Not unfrequently the dead are buried immediately under the mud floors of these dwellings of the living; and many of the graves in the cemeteries (which are always within the villages), being left open, are continually exhaling a stench that is utterly intolerable to any stranger. Then, again, the food of the Fellah is always of the worst description, and often too of the most scanty supply. Rotten cheese, decayed vegetables, semi-putrid flesh or fish; such are the articles that he lives upon. The very water that he drinks is filthy and impure. And then think of his mental and moral condition; the brutish degradation of all his faculties and affections, his hopeless servitude, his blank unmitigated wretchedness.

The hygienic state of the cities and larger towns in Egypt is not much better than that of the villages. Cairo, with its 200,000 inhabitants, is a very hot-bed of the most disgusting and pestiferous impurities. From the canal, which traverses it, there is constantly steaming forth a cloud of intolerable offensiveness; and yet this is the supply of water for the use of its people! There are no fewer than 35 cemeteries, of which 25 are within its walls. In the Copt quarter of the town, the dead are buried under the floors of the houses; and nothing but a few boards separate the living from the putrid bodies of the deceased. From 80 to 90 corpses have been known to be huddled together in these horrible *sub-domal* receptacles. Can we therefore wonder that Cairo should be a generating focus of pestilential disease?

That the circumstances now mentioned must tend to promote the development, and aggravate the intensity, of the plague will be disputed by none; but then the question comes to be, are they sufficient to produce or originate it? This thing is certain, that the disease has never been known to appear spontaneously in Egypt, except in places and seasons when these most pernicious agencies were at work.

The plague does not arise in Upper Egypt, Nubia, and Abyssinia; nor does it ever extend above the first cataract of the Nile. The good quality of the soil, the ready efflux of the waters, the small number of the inhabitants, and the strong currents and agitations of the atmosphere appear entirely to counteract the morbid influence of the mode of life followed by the inhabitants.*

We are informed by Gaetani Bey†—first physician to Mehemet Ali, and who has resided in Egypt for the last 25 years—that the plague never extends beyond Assuan, in consequence of the difference in the situation, heat, dryness, and nature of the soil; whereas it readily finds its way into the localities where there is much stagnant water. It is for this reason that Bagdad and Bussorah are in the present day subject to invasions of the pestilence, from which they were formerly exempt when effective police regulations were in force in these towns.

The seasons exert a no less marked influence on the development of the plague. The dry heat of what is called in Egypt the second summer, the prevalence of the northerly wind that usually sets in about the summer solstice, and the first dews that commence about this time, change alike the condition of the atmosphere and the organic aptitudes or susceptibilities: the pestilence ceases.

What has been now said respecting the artificial insalubrity of Egypt, arising from man's own negligence and vice, is nearly quite as applicable to Constantinople as it is to Cairo. The filth of some of its environs is altogether intolerable and disgusting. It is usually in the month of July, when the north or tramontane wind ceases and is succeeded by a southerly sirocco, that the pestilence makes its first appearance. As a matter of course, the putrefaction of all organic matters goes on much more actively at that season, in consequence of the high heat on the one hand, and the moist relaxing influence of the wind on the other. The localities, that are first attacked, are those which are chiefly occupied by the poor Greeks and Jews: hence the village of San Dimitri is usually the place where the earliest cases are observed.

* *Destruction de la peste et des quarantaines.* (*Bulletin de l'Academie Royale de Medecine*,—Paris, 1844, t. x. p. 40.)

* Pariset, *Causes de la peste.*—Paris, 1837.

† *Sulla peste che afflisse l'Egitto, l'anno* 1835. *Napoli* 1841.

We need scarcely say that, if Constantinople be bad, Erzeroum is much worse, in everything that respects hygienic salubrity. Fortunately the frequent severity of the winter season there, as well as the high winds that prevail in Armenia, tend much to attenuate the existing causes of the plague.

If from the Euphrates we pass to the Danube, we shall find the same causes of endemic insalubrity prevailing in those localities, where the pestilence has been known to arise. The poorer classes in Moldavia and Wallachia live in the greatest misery and filth. After the heats of summer, almost all the prevailing diseases assume a character of marked gravity. Malignant intermittent fevers are always more or less prevalent in autumn; these generally precede the appearance of the plague, which in these countries is usually only sporadic. Professor Seidlitz has endeavoured, as we have already seen, to establish the intimate connection between these two forms of febrile disease.

Dr. Mirolanof, who treated the plague at Achial in 1828, says that "the soldiers and officers, who had the intermittent fever, were affected with bubos and carbuncles. In the month of September the plague shewed itself especially in those who were convalescent from agues, and assumed the form of a tertian fever. The bubos appeared after the first or second paroxysm."

Dr. Rinx, who was at Adrianople during the whole course of the epidemic, remarks of the third degree of the epidemic that "the least severe degree of the plague so much resembled an intermittent fever that it was scarcely possible to distinguish the one from the other, before the appearance of the bubos."

From all these various facts, it is abundantly obvious that the hygienic condition of the four distinct localities, in which the plague has of recent years broke out spontaneously, is very nearly the same. It is a circumstance, too, of no trifling import that, wherever the producing causes of the disease are most abundant and concentrated, there it is always most severe and most readily propagable. The form most dreaded is that which appears in Egypt; next comes that of Constantinople, and after this that of Erzeroum; while that of the Danube, which has hitherto been generally regarded as of Constantinople growth, has not yet been sufficiently studied to enable us to decide respecting its relative severity.

Is it not also a remarkable fact that the four geographical points or localities, now mentioned, are all subject to malignant intermittent and other fevers? Are we to believe, with MM. Begin and Boudin, that the plague belongs to the family of marsh fevers? There are many circumstances certainly which seem to militate in favour of this opinion. Without dwelling on the geographical condition of Syria and other plague countries in the present day, we well know how prevalent intermittent fevers were in London during the 17th century, when that city was occasionally visited by the oriental pestilence. The readers of Sydenham are well acquainted with this fact.

The outbreak of the plague has not unfrequently followed upon wars, famines, and other wasting calamities; and, on the other hand, its ravages have invariably been observed to become less frequent and less desolating in proportion as the condition of the inhabitants of the affected countries,

in point of civilization and comfort, has improved. The researches of MM. Papon* and Aubert-Roche† have satisfactorily proved the truth of this.

The general *conclusion* to which we arrive is that,

"In all countries where the spontaneous plague has been observed, its development may be reasonably attributed to certain determinate conditions acting upon a large portion of the inhabitants. The principal of these conditions are, residence upon marshy alluvial soils near the Mediterranean or near certain rivers, as the Nile, Euphrates, and Danube; the dwellings being low, crowded, and badly ventilated; a warm moist atmosphere; the action of putrescent animal and vegetable matters, unwholesome and insufficient food; and great physical and moral wretchedness."

CHAP. III.—*If the preceding statements be correct, the plague must be endemic in Lower Egypt, where all the conditions of insalubrity which we have pointed out are constantly present: Is such the case?*

All the most accurate and enlightened observers agree in answering this question in the affirmative. Not a year passes without the plague shewing itself at Alexandria in a *sporadic* form; generally between the months of November and the following June. This fact cannot be disputed; it is incontrovertibly proved by the reports of the Council of health that was established in that city 12 years ago. The same thing holds true with respect to Cairo, and other places in Lower Egypt; the testimony of Gaetani-Bey is unqualified upon this point. The *epidemic* plague, that which has so fearfully mowed down the Egyptian population, is happily more rare; although incomparably more frequent than in any other country of the world.‡ The number of epidemic invasions of the pestilence in Egypt from the year 1695 to 1834, have been (according to one statement drawn up by an Arab cheik) 19 in all. The mortality caused by some of the invasions has been truly frightful. If we take account of those only which have been very destructive of life, we find that Egypt has been visited with the scourge about once in every ten years.

Conclusion.—"All the producing causes of the plague being found united in Lower Egypt, the disease is endemic in that country, where it is seen every year in the sporadic, and about every tenth year in the epidemic, form."

The object of the next Chapter, the IVth, is to shew that Egypt was exempt from pestilential epidemics in ancient times, and until about the commencement of the seventh century of the Christian æra. Certain it is, that we have no very authentic account of any wide-spread and destructive invasion of the plague at an earlier period. The cases, alluded to by Rufus, appear to have been only *sporadic*; at all events, this writer makes no

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* *De la peste et des epoques memorables de ce fleau.* Paris, an. viii. 2 vol. 8vo.

† *De la prophylaxie de la peste*, Paris, 1843.

‡ According to the calculations of M. Hamont, the population of Egypt, which was once, it is believed, upwards of ten millions, and was fully three millions at the commencement of the present century, does not now exceed a million and a half.

distinct mention of any epidemic pestilence having ever prevailed in Egypt, as he does of one that ravaged Libya upwards of 300 years before the birth of Christ.

That Egypt was once a remarkably healthy country is expressly attested by Herodotus. The land was rich and very populous, abounding in all the necessaries of life, and the inhabitants were prosperous, enlightened, and happy. The custom of embalming the dead, not human beings only but animals of all sorts, may have had a salutary influence, by withdrawing so much corruptible matter from putrefaction and decay.* This "salutary practice" (of embalming) was abolished in A.D. 356.† Subsequently to this period, the ignorance and fanaticism of the Mussulmen have brought on that frightful state of moral degradation and physical wretchedness of which we have spoken in a preceding chapter. Is this lamentable state of things always to last, to the disgrace of the country and the injury of the world? There cannot be a reasonable doubt but that, if proper sanitary regulations could be established and duly executed in Egypt, the pestilence might be extirpated, and Egypt rendered as healthy as it was in days of yore. Mehemet Ali is well aware of the truth of this. His convictions on this point are so positive, and already he has acted so well in the right course, that Gaetani-Bey—who accompanies him twice a year in his tours of inspection across the Delta, from Alexandria to Cairo—has not hesitated to declare that, if the Viceroy was not thwarted in the execution of his plans, this great and desirable end might be accomplished.‡

The question proposed in Chapter V. is to the effect whether the present condition of Syria, of Turkey in Europe and Asia, and of the Barbary States has become so much changed or ameliorated, since the time when pestilential epidemics have broken out in them, as to justify any rational expectation that such invasions may not recur. The answer, as might be anticipated, is decidedly in the negative. Wherever the Ottoman dominion has prevailed, civilisation and social improvements have retrograded rather than advanced. We have seen, indeed, that the recently-instituted board of health at Constantinople has attributed the exemption of that metropolis from an invasion of the plague for some years past exclusively and entirely to the establishment of lazarettos and quarantine restrictions

* There seem to be some inconsistencies between a few of the statements in this chapter and those that have been already made, respecting the existence of the plague in Egypt in ancient times. We may remark also that the testimony of Herodotus, respecting the salubrity of ancient Egypt, is said to be at variance with that of other authors more worthy of credit. M. Daremberg informs us that Hæser (*Recherches historico-pathologiques sur les maladies epidemiques*) has collected together a number of texts to prove the unhealthiness of Egypt in ancient times. Compare also Lorinser, *die Pest* im *Orient*.

† M. Prus suggests, among other hygienic reforms necessary in modern Egypt, the re-establishment of the practice of embalming (!) or of some other equivalent method of counteracting the evils of animal putrefaction in that country.

‡ Sir W. Pym, in a letter addressed by him in Jan. 1845 to the Board of Trade, acquaints us that Mehemet Ali, on being informed that there was a very short quarantine in England against Egypt, replied: "There ought to be no quarantine, it is our own fault. *We must get rid of the plague!*"

there; but we must not be too ready to yield our unhesitating assent to this opinion.

It is not necessary to adduce any details to shew that the sanitary condition of such places as Erzeroum and the surrounding villages, of Tunis, Tripoli, &c., has not at all improved of late years, so that they should be less likely to be visited by the pestilence than they may have been hitherto. With respect to Algeria (Chap. VI.)—which seems to have been less frequently the scene of spontaneous epidemics of the plague than any of the other Barbary States, in consequence probably of most of the towns and villages being built upon the slopes of hills, and neither crowded together nor over-peopled—there is good reason to anticipate that, under its present administration, it may become as seldom the theatre of the pestilence as almost any of the countries of Europe.*

The answer to the question, proposed in Chap. VII.—*What are the means that should be employed to prevent the development of spontaneous plague?*—must be sufficiently obvious from what has been already said respecting the causes which promote, if they do not induce, the development of the disease in Egypt and elsewhere. M. Villermé has with great ability discussed the general question as to the origin and diffusion of epidemic diseases, and has very satisfactorily shewn that they invariably become less frequent and less destructive in proportion as countries pass from the miseries and degradation of barbarism to the social comforts of civilised life. Dr. Aubert-Roche also has with much care examined this subject, more especially in reference to the plague; and he comes to the same conclusion. In all times, and in all places, this disease has disappeared before civilisation; it has returned with a country's decline and barbarism. Everywhere the same causes have produced the same effects.

Second Part.

Chap. I.—*Has the plague always exhibited the principal characters of epidemic diseases, when it has raged with violence in Africa, Asia, or Europe?*

The characteristic features of epidemic diseases are these:—1. They generally manifest in their progress three distinct periods, of commencement, persistence or status, and decline. These periods often display neither the same symptoms, the same lesions, nor the same gravity. 2. During the prevalence of an epidemic, other diseases are less numerous than usual, and they receive the stamp or impression of the prevailing affection. 3. When an epidemic disease prevails, even those persons who retain their health generally feel its morbific influence more or less. 4. Epidemic diseases not unfrequently return and cease at the same season (of the year); and they have usually about the same duration. 5. An epidemic disease is often preceded by other affections, more or less severe and more or less widely diffused; these seem to be in some way its precursors.

* No quarantine now exists in France against Algeria.—G. M.

Now the plague exhibits each and all of these features in a striking manner. Its severity or malignancy is usually most intense on its outbreak, and for the first few weeks afterwards. Pugnet says that, towards the end of the epidemic at Cairo in the year 1800, almost every patient recovered notwithstanding the most opposite methods of treatment, whereas very few indeed recovered upon its first outbreak.* Not to accumulate authorities, we may state that Clot-Bey remarks that, "when an epidemic commences, almost all who are attacked with it perish. During the first period, death occurs within 24 or 48 hours after the invasion; in the second, on the 4th or 5th day, or it may be not till the 14th or 20th. There are scarcely any fatal cases in the third period;" the pestilence having by this time lost its malignancy.†

It must be obvious from this circumstance, how cautious medical men should be in estimating the value of any remedial means in the treatment of such a disease as the plague, and how important it is to pay great attention to the period of the epidemic visitation when these means have been employed. This is a great practical truth, which is far too little attended to in the present day. "At the commencement of the epidemic (1841)." says Dr. Penay, surgeon-major of a cavalry regiment in the Egyptian army, "I lost almost every patient, in spite of my best exertions. Subsequently, several got well without my being able to determine what line of treatment seemed to be of decided benefit. During the decline of the epidemic, nearly all my patients recovered, and the greater number without any other remedy except local applications to the bubos and carbuncles." The following extract from a report of M. Masserano, one of the members of the Egyptian council of health, is highly illustrative of the same subject.

"While the plague was at its height, almost all the persons who were attacked sunk at the end of four and twenty hours; and such was the violence of the epidemy in some of these cases, that the patients died suddenly while engaged in their employments, as if they had been struck with lightning. The pestilential characters in the middle, and towards the end, of the epidemy were much less intense. The acute cerebral congestions and complete state of prostration were no longer observed; and petechiæ were of rare occurrence. The sick were distressed with restlessness and weariness; exhaustion and headache threw them into a state of stupor. They experienced more or less severe glandular pains, shooting uneasiness in those parts where bubos were expected to appear: these bubos passed readily into suppuration. When the epidemy approached its close,

* *Memoire sur les fievres de mauvais caractere du Levant et des Antilles.* Paris, 1804.

† The following observations of Sydenham may be aptly quoted here:—

Observare insuper est quod, sicuti epidemicorum quilibet in subjecto particulari suas habet periodos (augmenti scilicet, status, et declinationis) ita etiam constitutio generalis quæcunque, quæ huic alterive morbo epidemice producendo favet, pro ratione temporis quo dominatur, suas etiam periodos habet, quatenus scilicet indies magis et magis epidemice grassatur, donec axuv attigerit suam, atque exinde iisdem fere gradibus decrescat, donec tandem penitus exoluerit, alteri constitutioni locum cedens. Symptomatum enim quod attinet vehementiam, atrociora sunt omnia ubi primum se ostendit; quæ quidem paulatim mitescunt, et in constitutionis catastrophe tam sunt benigna atque εφοφυτα quam patitur morbi natura in quo fundantur.—Observ. Med., sect. iv.

I saw many persons attacked with bubos, without discontinuing their occupations. Two of my servants, among others, were attacked with the disease in a mild form; they pursued their employment without saying any thing to me. At the time when the disease was most intense, we remarked that, out of 22 persons attacked, 10 died; whereas, towards the end, out of 60 seizures only two proved fatal."

What has now been said will abundantly show how truly the plague exhibits the *first* of the characteristic qualities of Epidemic Diseases. We proceed to examine the *second* one which we enumerated; viz. how far are other diseases, that may exist during the prevalence of the pestilence, influenced and modified by it. Diemerbrock, writing of the plague at Nimeguen in 1635-6, uses these words; *vix ullus morbus peste incomitatus fuit.* Pugnet says that "the plague stamps with its own peculiar character all other co-existing diseases." A proof and, at the same time, an effect of this decided influence of the pestilential constitution upon intercurrent diseases is the circumstance that these resume their own proper physiognomy (a remark made three hundred years ago by Prosper Alpinus*), as soon as the pestilence subsides. It would be easy to multiply authorities upon this subject, if it were necessary.†

All medical men, who have had an opportunity of studying the plague in Egypt or elsewhere, have remarked that, during the prevalence of an epidemic, those persons, who have already had an attack of the disease, usually feel pain or uneasiness in the scars of their old bubos and carbuncles, without their general health being much affected; and moreover that all those, who have escaped the disease and remain tolerably well, have still nevertheless experienced a certain feeling of *malaise*;—and even a slight degree of tenderness of the lymphatic glands in the groins and axillæ. This is the case equally with those who are in strict quarantine, or who enjoy free pratique. Dr. Delong, in his account of the Epidemic at Cairo in 1841, observes that, it may be fairly said that the entire population had the plague in its first and mildest degree. So impressionable and sensitive, are those, who have once had the plague, to a pestiferous condition of the atmosphere that, it has been supposed, they can generally predict the approach of the disease by the shooting pains and uneasiness in their old bubonic and carbuncular cicatrices. It is possible that in this way we may find out if a pestilential constitution (of atmosphere) exists, or is impending.

Does the plague exhibit the *fourth* character assigned to epidemic maladies? viz. that of having in general nearly the same duration in different countries, and of appearing and disappearing at epochs which may be determined beforehand?

M. Levison, the Russian Vice-Consul at Alexandria, has drawn up the following statement from the data supplied to him by the Cheik Ibrahim-Bassi:

* *Medicina Ægyptorum.* Lib. 1, cap. 16.

† Sydenham has remarked, in his description of the plague of London, that the ordinary endemic fevers of a country are apt to retain, for a season or two after a severe attack of the pestilence, some of its peculiar and characteristic features or symptoms; *pestilenti aeris diathesi etiamnum ex parte perseverante, nec dum in aliam salubriorem penitus immutatâ.*

"The most intense pestilential epidemics in Egypt are those which, commencing *sourdement* in November, have reached their acme about the end of February or during March. On the other hand, those, which have not displayed great violence, have always made their appearance in the course of this last month. In the month of June, both one and the other have often ceased.

The malignant plagues of Egypt have usually lasted about four months, whereas the milder ones have in general not exceeded two months, or two months and a half."

It is a remark as old as the time of Prosper Alpinus, and one which is amply confirmed by the observations of subsequent writers, that the disease in that country almost invariably ceases in the month of June.

At Constantinople, epidemic plague habitually begins in the first or second week of July—during the great summer heats and the prevalence of southerly winds and thick fogs—after or before the arrival of the convoy of merchant ships from Egypt and other places, and usually ceases towards the end of the year. The great plague of 1812, which had been mild up to the end of August, became very malignant in September, carrying off in little more than three months no fewer than 160,000 persons. It entirely ceased by the end of December. At Smyrna, the pestilence generally reaches its height in May, and ceases about the middle of August.

The *fifth* characteristic feature of epidemic diseases—that of being usually preceded by certain precursory maladies—belongs without doubt to the plague. Its outbreaks have been repeatedly observed to be preceded by bad forms of intermittent and continued fevers. "During the winter of 1816-17, there prevailed in this place," writes M. Berbrugger the learned librarian of Algiers, "a very fatal epidemic that was termed in the bills of health a malignant fever. This has been remarked to be a usual precursory sign of an outbreak of the plague itself, when this reappears after a long interval of time." Many analogous circumstances might be quoted. That Typhus not unfrequently precedes, and coexists with, the regular plague is admitted by most of the medical men who have resided for some years in Egypt. Dr. Delong, who lives at Cairo, has made the remark of the epidemic of 1841 that the plague often commenced under an intermittent form, intermittents having been prevalent for some time; and that quinine occasionally seemed to arrest the progress of the malady.

Such being the case respecting the frequent precedence of other epidemic affections to the outbreaks of the plague, it must be obvious that medical men may readily fall into a seeming error, if they happen to be consulted respecting the nature of an existing disease, before the proper pestilence has fairly manifested itself. Hence then the necessity of their giving a guarded opinion, whenever there are grounds to believe that a pestiferous state of the atmosphere is impending. Moreover, at the commencement of an epidemic, there are neither bubos, carbuncles, nor petechiæ in most of the cases. Gaetani-Bey has pointed out a very useful diagnostic sign to direct the medical observer under such circumstances. The lymphatic glands, internal as well as external, should be most attentively examined; and if the patient has died of the plague, one or more of these glands will invariably be found to be enlarged and more vascular than usual. The dissections, made at Abouzabel in 1835 by the medical men

who did not then know the opinion of Gaetani-Bey, amply confirmed the justice of his remark.

The facts and observations, adduced in this chapter, lead distinctly to the *conclusion* that "the plague combines in a very marked degree the principal characters of epidemic diseases."

We shall now briefly look at the causes of pestilential plague considered exclusively in this point of view. These causes, like those of all epidemic diseases, are of two kinds. The first relate to the soil and the atmosphere; the second to the physical and moral condition of the inhabitants.

When Dupuytren enquired of the young Egyptian students, who had been brought by Clot-Bey to Paris for medical education, what was the opinion of the most enlightened men in Egypt respecting the origin of the Plague, the answer they gave was, "la peste vient de la terre." All that is conveyed by such an expression is merely that a humid and marshy soil, more or less covered with decaying vegetable and animal matters, is a powerful cause of the alteration of the atmosphere, and consequently of the disease. Now nothing can better serve to shew the importance of the conditions of the soil, in reference to the production of the plague, than the comparing together of two localities in the same country, inhabited by the same people, and governed by the same laws and customs, in one of which the disease is endemic, while the other remains entirely exempt from its attacks, even although the infected may die within its walls.

"Fayoum is elevated above the level of the sea: Damietta borders upon the shore. At Damietta, the air is hot and damp; at Fayoum, it is hot, but dry. Fayoum is free from marshes; Damietta is surrounded with ponds of fresh and salt water. While at Damietta the cemeteries are in the town itself; at Fayoum, they are at a distance from the dwellings. Here, the water, although not very pure, may be drunk without inconvenience, owing to the quantity of nitre it contains; at Damietta, the fresh water is either mixed with sea-water, or it is rendered impure by excrementitious products, and by animal and vegetable matter in a state of putrefaction. Fayoum is surrounded by the desert of Lybia; Damietta is enclosed by rice-fields, and situated in front of the pestiferous Delta."

Great atmospheric vicissitudes have also a decided influence on the development and progress of epidemic plague. Larrey, Pugnet, and all other physicians who have seen the disease in Egypt, agree that its attacks are more frequent, and its mortality greater, when the air is warm and moist, and when the weather has been stormy. At Constantinople, the same causes produce the same effects. We shall not enlarge upon this subject; but only add that it has been too generally supposed that it is to some causes, either actually or recently existing, in the condition of the soil, the atmosphere, or the kind of food, that we must refer the morbific effects observed. And yet, as remarked with his accustomed sagacity by Baron A. Humboldt, the most favourable cause for the development of epidemic diseases is to be found in a uniform and long-continued type of meteorological phenomena. For example, in the case of the plague, it is after a lengthened duration of the same temperature and of the same winds that the pestilence, in an epidemic form, has been observed to break out in Egypt, Syria, and at Constantinople. It may be readily believed that, when a population has lived for a length of time in the same conditions of

climate, atmosphere, alimentation, &c., the system of each individual becomes profoundly modified in the same manner, and may be disposed to receive, or even to develop spontaneously, the same disease. Perhaps it is in this way that we may account for what has been very positively asserted to be the case by some authors, but denied by others, viz. that persons, who have been long exposed to the same physical influences, may become affected with the same disease at a given period, although they are then far distant from each other.

The action of epidemic diseases is observed to vary much in point of degree or intensity in different races of mankind, when exposed to the same morbific influences. No fact has been more clearly proved than the very peculiar predisposition of negroes to contract the plague. To Dr. Aubert-Roche we are indebted for the following table of the relative mortality in the different races, during the great plague at Alexandria in 1835:

Negroes and Nubians lost . .	1528	out of	1800 =	84 per cent.
Malays	367	„	600 =	61 „
Arabs, not soldiers	10,936	„	20,000 =	55 „

The Negroes, Nubians, and Arabs were all living in nearly the same hygienic conditions, and were all in free pratique. With respect to the other residents in Alexandria, our conclusions must be more uncertain, in consequence of the very great difference in point of hygienic condition, isolation, &c., enjoyed by different classes of the population. Here, however, are Dr. Roche's calculations:—

Greeks	lost	257	in 1800 =	14 per cent.
Jews, Armenians, and Copts . .		482	„ 4000 =	12 „
Turks		678	„ 6000 =	11 „
Italians and others from the South of Europe		118	„ 1600 =	7 „
French, English, Russians & Germans		52	„ 1000 =	5 „

These figures carry with them their own signification. It is scarcely necessary to say that the liability to the attacks of the pestilence among all classes of the population, native or stranger, is almost uniformly observed to be inversely proportionate to their cleanliness, good living, and general comfort. An instructive illustration of the truth of this is afforded by Dr. Roche.

"On the banks of the canal, which leads from Alexandria to the Nile, lies a property belonging to the Greek consul, M. Tortizza, who received it as a present from the viceroy. The fellahs who work upon this property, being better treated and better fed than the fellahs of the surrounding villages, only lost, during the epidemic of 1835, 12 out of 400; while their neighbours, placed in the same conditions with respect to atmospheric influences and free communications, lost one half of their number."

Having most satisfactorily shewn that the Plague must be placed in the first rank of epidemic diseases, M. Prus makes the following general reflections upon the subject:—

"The epidemicity of the plague is in truth the fundamental fact of its history,

that which most merits the attention of the physician, and which can alone make him comprehend a number of points which, without taking it into account, remain in complete obscurity. The certainty that the plague is a disease which is epidemic in a marked degree, will suggest another consideration to the mind of the physician. It will furnish him with the means sometimes of preventing, and always of diminishing, the ravages of the pestilence. If the existence of epidemic *foci* of plague is satisfactorily demonstrated, things will not affect in the same manner those who remain in or who come into these *foci*, as they do those who are placed, or who remove themselves, beyond their influence.

"Every person remaining in an epidemic focus of plague is exposed to contract this disease. Numerous and authentic facts, observed in Egypt during the years 1835 and 1841, have proved that the most complete isolation and the most severe quarantine do not always preserve those who submit to them. The same remark had been made in as positive a manner at Marseilles and at Toulon, at the time of the plague of 1720.

It requires sometimes but a very short period to be passed in an epidemic focus to become affected with the plague. The professors of the school of medicine at Abouzabel,—which, in 1835, was not attacked by the epidemic influence for more than a month after the capital was ravaged by the disease,—have seen inhabitants of that place, who have only remained a few hours at Cairo, return infected.

"Now, what will happen to persons in health, or already affected with the plague, who shall remove from or be taken beyond the epidemic focus? Before answering this question, we must receive it as a fact recognised by science that, in the most wide-spread and severe pestilential epidemics, experience has shewn that all the localities of the same country have not been subject at the same period to the epidemic influence. It has been stated a hundred times that, by the side of a town ravaged by the plague, other towns in free communication with it continued exempt from the disease. Nay more, plague-patients out of infected towns have come either to die or to be cured in localities where the epidemic influence did not prevail, without the disease having spread. We shall find numerous examples in support of these two propositions, both in the works of modern writers on the plague, and in the documents annexed to this report. Observation has also taught us that it is often tolerably easy to determine the limits of the epidemic focus. This may be circumscribed within the limits of a single town, as Pagnet remarked at Damietta at the time of the plague of 1799, or as was seen at London in 1665, notwithstanding that in both instances the communication with the neighbouring towns remained perfectly free.

"This being established, we may assert, in answer to the question stated above, that, when a population is struck with a pestilential epidemic, persons, whose duties and interests do not require them to remain in the midst of the epidemic focus, will escape the danger by withdrawing from the infected district.

"In 1835, when the epidemic constitution prevailed at Cairo, Gaetani-Bey advised that the 22,000 of the soldiers on active service, composing the garrison, should be sent some leagues from the city, and be encamped under tents in a dry and airy situation, leaving only 2000 invalids for the service of the city. The plague did not commit any ravages among the active troops, whereas it raged among the 2000 invalids as it did among the rest of the population."

Some time before this, Clot-Bey had given a similar advice respecting the fleet which was in the harbour of Alexandria. Although put and kept in severe quarantine, the pestilence made its appearance on board some of the ships, while they remained exposed to the epidemic influence. Not a single case occurred, when the fleet was withdrawn from the focus.

In 1813, Sir Thomas Maitland the Governor of Malta, finding it impossible, in spite of the most severe measures, to extinguish the plague

which then prevailed at La Valetta, took the resolution to have barracks constructed fairly out of the city, and obliged the population forthwith to occupy them. From that moment the plague entirely ceased.

Dr. Masserano has related a similar instance with respect to his regiment in garrison at Damietta in 1841; removal to a healthy spot at once put a stop to the disease.

The enlightened portion of the inhabitants of Cairo and Alexandria has already begun to discover the inutility of quarantine within their own dwellings, and now trusts for safety only to removal beyond the sphere of infection. The Persians have long acted upon this principle, and have no doubt found its advantage.*

Removal from an epidemic focus has been found to be most useful, not only in preserving the unattacked from the pestilence, but also in promoting the recovery of those who have caught it. On this latter point, Dr. Delong observes in reference to the plague of 1841:

"When I had the good fortune to be called at the onset of the disease, I instantly ordered a change of abode; whenever it was possible, I caused my patients to be removed to situations that were elevated, dry and airy. The disease then almost always assumed a more favourable appearance, and the morbid phenomena were found less to resist the combined action of nature and of a sound method of treatment."

A similar remark was made by the medical men at Abouzabel in 1835, and it has been repeated by M. Penay in the history of his patients in 1841. The *conclusion*, to be drawn from the numerous facts and observations that have been adduced in this chapter, is surely that,

"Whenever the plague has raged with violence in Africa, Asia and Europe, it has always exhibited the principal characters of epidemic diseases."

Chap. II.—*What are the differential characters between Epidemic and Sporadic Plague?*

The medical men residing in Egypt, as well as those at Smyrna and Constantinople, agree, almost without exception, that the sporadic form of the disease is not transmissible;† whereas, with respect to the epidemic form, many of them hold the opposite opinion. This is, indeed, just what might have been expected, for it is in exact accordance with the views entertained by most observers on other analogous diseases (Dysentery for

* Lacheze, *Memoire sur la peste en Perse.*

† The testimony of Dr. Laidlaw, who has resided so long in Egypt, and seen so much of the disease, is very strong upon this point:

"I have no hesitation whatever," says he, "in expressing my decided conviction that, unless the state of the atmosphere is favourable to the spread of the disorder, as is undoubtedly the case during the epidemic, there is no danger whatever from these causes, that they were purely accidental, and that it is impossible to produce by them the spread of the disorder. I have never seen a case of plague occurring sporadically where any person about the patient or in contact with him was attacked; and I cannot find any one that has seen one, although it is talked of among the Levantines as a common occurrence."—*Dr. Bowring's Observations.*

example), which occur at one time sporadically, and at another time epidemically: in the former case, the malady is not transmissible; in the latter, it is often so in a very high degree.

If we admit the accuracy of this opinion, it will be obvious how important it must often be for a medical man to determine if a case of plague be simply sporadic, or if it be connected with a pestiferous constitution of the atmosphere. As a matter of course, this point cannot be fairly determined by a mere summary or off-hand enquiry; things must be carefully watched for some time, before a decided opinion is given. If the disease be limited to a few isolated cases, and if these occur only in the localities where the pestilence arises spontaneously, there will be reason to believe that its type is merely sporadic. The disease too is usually less malignant in this than in the epidemic form. The sporadic plague does not exhibit in its course the three regular periods of commencement, persistence, and decline; nor is it preceded by other epidemic disorders. Moreover, other maladies are not less numerous than usual, nor do they display anything of the prevailing pestilential stamp or impression; persons in health do not experience the effects of an atmospheric influence acting in an especial manner on the lymphatic system; and lastly, whereas the epidemic form of the disease commences between November and February, and ceases about the end of June, the sporadic form is observed in every month of the year. The *conclusion* is therefore very fair and obvious that "Sporadic differs in some very important respects from Epidemic plague."

Chap. III.—*Does the plague extend, like most epidemic diseases, by the migration of certain atmospheric influences, and independently of the agency of the sick who are affected with it?*

Whoever examines with attention and candour the histories of many epidemics of the plague, can scarcely fail to observe that the disease has often broke out about the same time in a number of different localities, distant from and having no intercourse whatsoever with each other. Always originating in unhealthy spots under the influence of those causes which have been already mentioned, the epidemic pestilence may be either confined within the circuit of a single town or city, although this remains in free communication with the surrounding district, as occurred at Damietta in the year 1799; or else it may become diffused over a number of countries, as in the formidable epidemics of 542 and 1348. It is scarcely necessary to adduce further instances to prove that the localities and districts, immediately adjoining to an infected spot, often remain quite exempt from the disease. Not unfrequently several towns are attacked about the same time, the intermediate villages remaining quite free; at other times, the pestilence advances in a more regular manner, attacking a number of places "de proche en proche" and in succession.

Clot-Bey and Dr. Roche are of opinion that the plague may traverse seas, and pass from one continent to another—from Alexandria to Marseilles, for example—through the medium of the atmosphere alone. On the other hand, that it may meet with insurmountable obstructions not far from the spot where it has arisen, would seem to be the case from the well known fact that the plague of Lower Egypt never passes beyond the first Cataract of the Nile. In some malignant epidemics, indeed, the dis-

ease spreads into districts that are very generally spared. This has been observed at certain periods in Upper Egypt and the Hedjaz.

It appears that the plague never extends to a great elevation above the level of the sea. There is a village about five leagues from Constantinople, situated on the mountain of Alem-Daghe at an elevation of about 500 *metres*, where the pestilence has never been known to exist: it serves, indeed, as a place of retreat to the inhabitants of the Turkish capital during the prevalence of an epidemic. On the same mountain, but at a less elevation, there is another village that by no means enjoys the exemption of the first. There is a spot in Malta to which the plague has never reached; from this circumstance it has received the name of safi (pure). According to the testimony of Desgenettes and Clot-Bey, the Citadel of Cairo, which stands upon a lofty eminence, has uniformly escaped during the worst epidemics that ever raged in that city.

A most important question here suggests itself to our consideration; viz: *When a pestilential epidemic prevails in a place, how many cases of the disease are to be attributed to the influence of the epidemic constitution, and how many either to the absorption of the miasms emanating from the sick, or to direct or indirect contact with them?* As may be imagined, the solution of this problem is attended with many difficulties. Dr. Lacheze, when physician of the hospital at Cairo in 1835, endeavoured to determine the point. According to the observations of this gentleman, not more than one person in 400 of those who were entirely isolated or in quarantine was attacked; whereas the pestilence of that year carried off no fewer than one in three of the general population, that remained in free pratique. Without disputing the accuracy of the figures given by this gentleman, it is the opinion of many able observers that they should be interpreted very differently from what M. Lacheze has done; at all events, it must never be forgotten that the very persons, who put themselves in quarantine during the prevalence of an epidemic, are precisely those who enjoy the greatest comforts of life and pay most attention to a hygienic regimen. The Commissioners were therefore desirous of obtaining if possible some less objectionable data for comparison, and it occurred to them that the best plan would be to ascertain the results in some large public establishment, either at Cairo or Alexandria, the inmates of which were living in very nearly the same conditions as the rest of the population out of doors. For this purpose, the Arsenal at Alexandria, which always contained 6000 workmen at the least, was selected for observation. Now, what has been the result of their enquiries? The words of the report are these:

"In this establishment, no attack could be attributed to an accumulation of pestilential miasms. Such an accumulation never existed; for, whenever an invalid was discovered to be infected, he was instantly taken into an hospital situated without the arsenal. Neither could contact with those infected be regarded as the cause; since, whether from the invalids having been removed at the beginning of the disease, or from quite a different cause, the neighbours of those who were seized with plague, as well as those who had touched them, were never attacked with the disease. The number of workmen at the arsenal, removed to the hospital on account of plague, gives us then that of the cases attributable to the epidemic, apart from any other, agency. Now 300 workmen having been attacked with the disease in a total of nearly 6000, we may fairly believe that the epidemic influence alone acted upon one individual in every twenty. This proportion is

without doubt very different from that pointed out by M. Lachèze; but it also varies very considerably from that furnished by the population in free pratique; for this at Cairo and Alexandria, as we have already seen, lost one in every three. Are we to believe, with Clot-Bey, that the difference of hygienic condition completely accounts for these facts, and that, if the mortality among the workmen in the hospital did not amount to one in every three of their number, this was solely owing to their having been kept cleaner and better fed than the rest of the working population at Cairo and Alexandria?

"While we readily recognize and publicly admit the very great power of hygiene in preventing and moderating the ravages of the plague, we must at the same time distinctly state that the deductions drawn by Clot-Bey appear to us to exceed what the facts warrant.

"Neither can we assent to his final conclusion, that all cases of plague should be attributed to epidemic influence alone. We must reject this conclusion, on the one hand, because it does not appear to us to be based upon positive and satisfactory proofs; and on the other hand, because, if it were rashly received, it would have the serious inconvenience of checking all enquiry into those causes, which, secondarily, tend to propagate the plague, and increase its fatality. In science, a false explication is less dangerous in that it extends error, than that it impedes the search after truth.

"From the facts and considerations contained in this chapter, we think we are fairly justified in drawing the following *conclusion*:

"The plague, abstractedly from the influence which the infected may exercise, spreads itself after the manner of most epidemic diseases, viz. by the action of general causes."

Third Part.

We now approach the question of the transmissibility of the plague, away from or beyond, as well as within, epidemic foci—a question, we need scarcely say, of the highest importance and, at the same time, of very difficult solution. The first point that we shall discuss is this:—

Chap. I.—*Is the plague transmissible by inoculation either of the blood drawn from a vein, or of the pus from a bubo, or of the serosity from the phlyctena of a carbuncle?*

"It is obvious," says M. Prus most justly, "that if the plague be truly a virulent disease (*à virus fixe*, to use the expression of certain writers), the possibility of the inoculation of its virus would approximate it to epidemic contagious diseases; whereas if it does not furnish any principle, liquid or solid, that is susceptible of being inoculated and of producing a virus similar to that which gave it birth, the disease must be withdrawn from the class of diseases that are properly contagious, such as Small-pox, and would approach in this respect the character of Typhus, which is propagated by peculiar miasms, but which gives out no inoculable element."

And here it should be noted as an important fact that, if the diseases which are indubitably *contagious*—Small-pox, Hydrophobia, Glanders, and Syphilis, for example—all present us with a palpable liquid which contains the poisonous principle, such is certainly not the case with the Plague. Hence medical men have operated, by turns and almost indifferently, with

the pus of a bubo, the serosity of a carbuncle, or even with the blood itself of a pest-patient.

The experiments that were made in Egypt by Desgenettes, Whyte, and a few other physicians, about the beginning of the present century, to ascertain the effect of the direct inoculation of the matter taken from plague bubos, are anything but satisfactory or conclusive. We shall therefore not dwell upon them, but at once proceed to notice those which were instituted in 1835 at the Cairo Hospital in the presence of Gaetani-Bey, Clot-Bey, and Drs. Lacheze and Bulard, and which are deserving of all confidence.

Five criminals, who had been condemned to death, were the subjects of the experiments. A lancet, wetted with the blood drawn from a pest-patient, was passed under the epidermis on the inside of the arm of one of these criminals, at two different points. On the third day afterwards, the man was affected with confirmed plague—so, at least, says Dr. Lacheze, who reports the experiment; Clot-Bey thought the case doubtful. Three days subsequently, the man was convalescent.

In three other cases, no effects followed the inoculation of the blood. In two cases, the serosity from a carbuncle, and in one the pus from a bubo, was used for the purpose of inoculation: in none of these cases, was the disease induced.

With respect to the single case, in which the disease (mild indeed) occurred after inoculation with the blood of a pest-patient, it must be kept in mind not only that the man was exposed, as a matter of course, to the epidemic atmospheric influences then existing in Cairo, but also that, for three days before the performance of the experiment, he had been living in a pest-hospital, which was necessarily a focus of pestilential infection.

Clot-Bey inoculated himself, in six different punctures, with the blood of a pest-patient: no constitutional effects followed. A few days subsequently, he inserted some pus from a bubo on the inner part of his left arm: this was followed by a slight indisposition, which he attributed to the absorption of the purulent matter, but which bore no resemblance to the symptoms of plague.

The results of certain trials made by Professor Pruner in 1829, and by Dr. Rossi in 1841, were altogether similar.

The general *conclusion* of the Commissioners upon the important point under consideration is to this effect:

"The results of the inoculation of the blood drawn from the vein of a plague patient, or from the pus of a pestilential bubo, have been equivocal; the inoculation of the serosity taken from the phlyctenæ of a pestilential carbuncle has never given the disease. It is therefore not proved that the plague can be transmitted by inoculation, even under the influence of a pestilential constitution.

"We are not acquainted with any experiments that have been made upon the same subject, at a distance from an epidemic focus.

"It is useless to observe that the study of the effects which might have been obtained from inoculation of the plague, a study so important for the knowledge of the nature of the disease and consequently of its transmissibility, presents, nevertheless, no direct application to the question of quarantine. There can be no fear that the mass of a population will ever allow themselves to be inoculated with the plague."

CHAP. II.—*Is the plague observed, in epidemic foci, to be transmissible by immediate and direct contact with the sick?*

The Arabian physicians, as well as their predecessors, regarded the disease as purely and simply epidemic, and seem therefore not to have troubled themselves in seeking to determine if the disease be communicable from one person to another. We must come down to the middle of the 15th century, the time of Fracastorius, before we meet with any formal exposition of this doctrine. The celebrated physician of Verona recognised three modes in which the plague may be communicated:—1, direct contact with the sick; 2, the infection or contamination of goods, clothes, &c.; and 3, diffusion of morbific miasms through the atmosphere. The relative frequency of these three modes was believed to be in the order that they are here enumerated; the first being supposed to be by far the most common, and the last to be comparatively very rare. These opinions of Fracastorius prevailed almost universally down to the year 1720. In that year, Chicoyneau, Verney, and Deidier of Montpelier maintained with considerable eclat the doctrine of the non-contagiousness of the plague; they regarded it as purely epidemic. Their chief argument was, that they had touched the bodies of plague-patients without taking any precautions, and that they had not caught the disease. The opposite and older opinion, however, continued to be very generally held in the schools.

In 1771, Mertens, Orræus and Samoilowitz, who had an opportunity of watching the plague at Moscow, declared their belief that it was propagable only by direct or indirect *contact* with the infected, and never through the mere medium of the air. Stoll, however—who is characterised by Dr. Prus as the most able observer, after Hippocrates and Sydenham, of epidemic diseases—was not at all satisfied with the prevailing opinions on the subject in question, and pointed out in the following (ironical?) passage the necessity of re-examining them with care and candour.

"He who would deny," says this truly enlightened physician, "the contagion of the plague, and attribute a very grave disease to an epidemic cause, acting equally upon all, but not producing equally upon all the same effects, and would ascribe it either to the constitution of the year, or to an alteration in the air more fit to produce putrid diseases than in other years, that person, I say, would assert (what would be considered) a paradox. But, at the same time, whatever truth he might utter, and whatever service he might render in the calamitous conjuncture, it were well for him to be at a distance. He, who would hold this opinion, might find abundance of arguments, which could not be refuted, in all the authors who have written on the plague, even in those who have advocated contagion; unless, indeed, the love of the marvellous should make him despise or overlook the most simple causes, which he might find at his very feet."

All the medical men who accompanied the French expedition to Egypt, Assalini alone excepted, were of the opinion that the plague is propagated by *contact* with the infected. For nearly forty years after their return, this opinion has been universally received, and acted upon. It was not till 1835, that a change of sentiment began to be manifested among medical men on this most important subject. In the course of that year, as we have already seen, a number of European physicians had an opportunity of studying the terrible pestilential epidemic that ravaged Egypt. Impressed at first most firmly with the belief of the transmissibility of the

disease by contact with the sick, they have all, with scarcely one exception, completely changed their opinion; as, indeed, MM. Brayer and Cholet, who had observed the epidemics of 1819, 1826, and 1834 at Constantinople, had previously done. The writings of these last-named gentlemen, and subsequently of Clot-Bey and Aubert-Roche, have mainly contributed to effect this very remarkable revolution in medical doctrine. We shall briefly note a few of the most interesting facts, which have been of late years made public.

During the pestilence of 1824, upwards of 30,000 persons died in Cairo, while not more than two or three cases occurred in Alexandria, although the communication between these two cities was constant and uninterrupted. In 1834, on the other hand, the plague broke out and continued in Alexandria for a very considerable time, before it made its appearance at Cairo; and it had existed for fully eight months in the former city, before there was any sign of it in Mansoura and Damietta, although the daily intercourse between these places remained entirely free. Dr. Coch, principal physician of the Egyptian fleet, mentions an interesting fact observed by him in 1835. Ten men had gone from Sakkarah, a populous village, to Cairo, where the plague then existed. On their return home, every one of these men sickened, and died; yet not a single member of their families, who had assiduously waited upon them, took the disease. "Such a fact," it is emphatically added, "was observed hundreds of times during the course of this great epidemic." The same gentleman states that, the Viceroy having ordered that all vessels in which the plague appeared should be subjected to a quarantine of 11 days, the sick were immediately disembarked and carried on shore by the sailors of the fleet; and, although these sailors returned on board and communicated freely with the rest of the crews, not a single case of infection was the result.

We owe the following facts to Dr. Roche. The ports of Suez and Cosseir on the Red Sea draw the chief supply of their provisions, the one from Cairo, the other from Kench in Upper Egypt. In 1835, the plague broke out at the latter place about the same time that it made its appearance at Cairo. Suez was attacked by the pestilence; but Cosseir remained quite exempt. The first of these places is surrounded by stagnant marshes, a state of things not unlike to what exists in all the towns of the Delta; the second is built upon rocks, and is surrounded by bare arid hills. During this epidemic, Djedda, Yambo, and Moka enjoyed the same immunity as Cosseir, although the sick from Suez and other infected localities often died in the midst of them. Still more convincing is the following statement:—

Every year pilgrims depart from all parts of the country, subject to the laws of Mahomet, to go to Mecca. Caravans from Morocco, Darfour, Egypt, Constantinople, Persia, Asia Minor, and Syria converge at Djedda, at Medina, then at Mecca, the central point. They carry merchandize with them, for this pilgrimage is also a fair. Has the plague ever broken out at the place of meeting of all this population and all this merchandize, which have often, be it remembered, come from places infected by it? No. On the contrary, it is proved that, from time immemorial, the plague has never been seen in Arabia. The epidemic plagues, which desolated a great part of Lower Egypt in 1825 and 1835, had not one victim in

Arabia, notwithstanding the daily and perfectly free communication which existed between these countries. This has also invariably been the case with respect to the pestilential epidemics of Constantinople, Smyrna, or Syria. The Arabian historians pretend that their country owes this immunity to the protection of the Prophet!

Nubia, Sennaar, and Abyssinia, notwithstanding their close connexion with Egypt, are not acquainted with the plague. If it may be said regarding Arabia, Sennaar, and Nubia, that the heat in these places prevents the condensation of pestilential miasms; the same reason cannot be alleged for Abyssinia, which is a temperate country, the thermometer varying from 16 to 25 degrees Cent. above zero. Here the salubrity of the climate alone serves to keep the disease at bay. Abyssinia is a mountainous country with inclined plains, where there are neither marshes nor stagnant waters.*

For the extract which follows we are indebted to the work of Clot-Bey; allusion has been made to it in a former page.

"During the five months that the epidemic of 1835 lasted, MM. Gaëtani, Lachèze, Bulard, and myself at Cairo, MM. Duvigneau, Scisson, Perron, Fischer, at Abouz-Abel, and MM. Rigaud and Aubert, at Alexandria, visited the infected in the hospitals and in private houses. None of us took the least prophylactic precaution. We were in immediate contact with the sick during all the stages of the disease. We received upon our clothes and upon our hands the matter that was rejected by vomiting, the blood of those who were bled, the pus from the thousands of bubos which we opened. More than a hundred dissections were made at Cairo, and we passed whole hours in endeavouring to detect, in the bodies of those who had just expired, the pathological alterations which had hitherto been so little attended to. The same researches were made with equal care at Alexandria.

"Dr. Rigaud is the only one among us who fell a victim to the reigning epidemic.

"It is remarkable that many physicians, who scrupulously avoided all contact with the sick and with suspected objects, were attacked with the plague and died. Of this number are Dr. Mannucchi, sen., Leopold and Lardoni."

The observations made by different medical men, during the subsequent epidemics of 1837 in Syria and of 1841 in Egypt, amply confirm these statements of Dr. Roche and Clot-Bey. M. Granet was the chief medical officer of the troops stationed in the province of Adana (Upper Syria), when the plague broke out there in 1837. He was entrusted with all the sanitary regulations ordered by the governor. At first, it was attempted to arrest the extension of the pestilence by establishing a cordon around the infected spot. This was speedily found to be wholly useless: Upwards of 15 new cases were received every day into the military hospital, in which there were usually from 40 to 60 cases at a time. No precaution to guard against the risk of contagion was employed either by the medical men or by the other attendants of the sick; and yet not a

* Aubert-Roche, *ouvrage cité*, p. 100.

single case of the disease occurred among them, although the epidemic lasted for three months. "How can we believe," says M. Granet after relating these particulars, "that, if the plague be really transmissible by contact with the sick, we should not have had a single instance of this transmission?"

The evidence of Dr. Ibrahim, a native physician of Cairo, is highly satisfactory and convincing. He adduces many cases where one member only of a large household was affected with the plague, although the patient had been waited upon by the whole body of the domestics. The case of the wife of Hassan-Pacha, who died on the 35th day of the disease, is more than usually instructive; she had no fewer than two dozen white and black slaves, two kcios, two eunuchs, and four pages, in constant attendance upon her!

Dr. Delong also and M. Euzieres report many cases that occurred under their own immediate notice in Cairo, during the epidemic of 1841, in which the relatives of the sick, who had most assiduously nursed them up to the hour of death, entirely escaped. It seems unnecessary to give the details of any of them. In two cases, one of which proved fatal on the fifth day of the attack, the patients continued to suckle their infants; the children were not affected. In several instances, the disease attacked those who had sequestrated themselves by the most strict quarantine from all communication with the city; while others of their household, who were less timid, remained intact.

The testimony of Dr. Arnoux, surgeon-major of the 43rd regiment (Egyptian army) stationed in 1841 at Nabaro, of Dr. Dieterich of the 5th at Damietta, of Dr. Penay of the 5th cavalry at Neguille, and of Dr. Chedufau, chief physician of the central military hospital at Cairo during the same year, all serves to prove that the immediate attendants upon plague-patients are, on the whole, very rarely infected;—always provided due regard be paid to the ordinary hygienic precautions. The last-named gentleman informs us that, in consequence of there being no separate plague-hospital prepared when the pestilence broke out, the sick were received at first into the general hospital along with the other patients. There were no fewer than 182 cases of plague treated in this hospital; and, although the number of the ordinary inmates and attendants during this period amounted to 2,000, no instance of infection could be directly made out. None of the "officiers de santé," consisting of 92 Europeans and 300 Arabs, remained in quarantine, but waited upon the sick without taking any precautions. Only three of the Europeans were attacked; and, of these, two recovered. Three also of the Arabs suffered; they all died. M. Chedufau himself, besides his hospital duties, treated many cases of plague in the town, opening bubos, dressing carbuncles, and executing all the necessary medical duties to his patients. He performed, moreover, 17 *post-mortem* examinations. During the whole of the epidemic, he was in continual intercourse with the members of his own family; and yet, although no preservative means were employed, neither he nor any of his household suffered.

The experience of Dr. Perron, the director of the medical school at Cairo, confirms in every respect the truth of these statements. Not one

of the professors or pupils, who were in daily attendance upon the sick, was infected.*

After relating numerous other facts and statements, all bearing upon the question proposed at the beginning of this chapter, the *conclusion* is at length arrived at, that,

"On the one hand, immediate contact with thousands of plague-patients has not been followed by any dangerous consequences to those who have been exposed to it in the open air or in well-ventilated chambers; and on the other, that there is not a single fact which indisputably proves the transmissibility of the plague by mere contact with the sick."

CHAP. III.—*Is the plague transmissible by contact with the clothes or effects of the sick, in localities which are, or have been, recently exposed to the epidemic influence?*

After the plague of 1835 at Cairo, the clothing, effects, &c. of upwards of 50,000 plague-patients, who had been carried off by the pestilence, were sold in the public bazaars, without communicating, as far as is known, the disease in a single instance. More than 600 houses remained tenantless for several months after this frightful epidemic; they were then ordered to be visited, and an inventory taken of their contents. Not one of the persons engaged in this service fell sick.

Three thousand plague-patients were received into the large hospital of Esbequiè during the year 1835. On the cessation of the pestilence, the ordinary class of patients was admitted and put into the very same beds, which had been occupied by those who had died of the plague. The sheets indeed were changed, but the coverlets, which had never been subjected to any process of disinfection nor even freely exposed to the air, were used without alarm. No case of infection ensued. These facts were made known in 1840 by Clot-Bey, and have not since been disputed by anyone.

Dr. Brayer informs us that it is a fact perfectly well known in Constantinople, that the Jews buy up the clothes, &c., of persons who have died of the plague, however virulent this may have been, for sale at Fit-Bazar, where most of their stores are. No one dreams of using any means of disinfection, If the deaths be numerous, the bazaar is full; and *vice versa*. All the poorer classes resort thither for their clothing; and, generally, bundle after bundle is turned over and examined, before a purchase is made. In 1812, the "depouilles" of 150,000 victims of the dreadful pestilence of that year were brought together into that market! One portion was speedily bought by the inhabitants of the city; another portion was forthwith sent away into all the principal towns throughout the Turkish dominions; while what remained unsold was kept in close confined magazines, to be disposed of next year. Notwithstanding this dispersion of infected *fomites* to such a vast extent, nothing was heard of the spread of the pestilence thereby. It deserves also to be noticed that a smaller proportion of the Jews died than the Greeks, who, we may remark, have always had great fear of the contagion of the plague.

* We shall afterwards however find it stated that most of the *pharmaciens* in one of the hospitals at Alexandria caught the disease and died, and also that very many of the pupils in the hospitals at Cairo perished.

It would be easy to mention many other instances where the clothing, goods, equipage, &c. of persons affected with the plague have been taken possession of by others, without any injurious results. But this is unnecessary; suffice it to say that, in Egypt, Constantinople, Smyrna, &c. an epidemic of the plague is almost invariably found to subside and cease at a certain period known beforehand, whether any sanitary regulations have been taken to arrest its course or not; and that then the clothes and other property of the victims freely circulate in the bazaars of the place. If these objects communicated the disease to those who handled them, it is quite obvious that it would last much beyond the period at which it disappears with a truly remarkable regularity.

Such are some of the facts that have led most of the medical men resident in the East to believe, that the plague is not transmissible through the medium of *fomites*. Even although we do not go so far as this, it may surely with perfect truth be asserted, that in a vast number of instances, some of them indeed of almost continual recurrence, the pestilence has not been communicated by touching, or even wearing the apparel of those who have died from it, although no means of purification or disinfection had been employed. We are not prepared utterly to deny that the disease has been, and may be, sometimes transmitted in this way;* but after the striking facts which we have mentioned, we may very fairly withhold our credence from many of those histories on record of the plague having arisen in places previously quite healthy, from the introduction of infected objects. Most of the reported facts of this description appear to have been dictated by prejudice and accepted with credulity. Nevertheless, it must be admitted that some medical men, who have had extensive opportunities of observation, still maintain the opposite opinion. Of these, M. Grassi, principal physician of the lazaretto at Alexandria, and who has been in the Egyptian service for upwards of 20 years, is the person whose opinion is entitled to perhaps most consideration. We may state, however,

* Clot-Bey himself reports the following narrative:—

"On the 15th of April, 1835, (in presence of MM. Gaetani, Clot, Lacheze, and Bulard) two young criminals, Ibrahim-Assan and Ben-Ali, in perfect health at the time, were placed in beds which had just been left by patients affected with well-marked plague.

"In the night of the 18th, Ibrahim's pulse was slightly affected.

"The following day, he had the plague with bubos and carbuncles; he died on the 23rd.

"On the third day after he was in bed, Ben-Ali also felt the ordinary symptoms of an attack of the plague; but the disease abated, and convalescence began from the fourth day after the appearance of the characteristic symptoms.

"That Ibrahim-Assan died of the plague, after having slept in a bed recently left by an infected person, is a fact. But was it the sheets or other coverings of the bed which gave the disease? This is uncertain. Ibrahim-Assan was in a town where a pestilential epidemic raged; he was in a hospital which had contained and did still contain a great number of plague-patients, and in which several medical pupils and attendants had contracted the disease. It cannot then, in his case, be absolutely asserted that the plague developed itself by contact with contaminated objects, rather than by epidemic influence alone, or by miasmatic infection."

that the accuracy of many of the facts, which he has adduced in favour of his views, has been disputed or denied by Clot-Bey and others.

The general *conclusion*, to which the Commissioners have come, after a laborious investigation of all the particulars, is that

"Very numerous facts prove that the clothes and effects, belonging to plague-patients, have not communicated the disease to persons who have used them, even without any previous purification. The facts, which seem to indicate an opposite result, can only be considered valuable, if they are confirmed by fresh observations made beyond epidemic *foci*, at a distance alike from *foci* of miasmatic infection and from countries where the plague is endemic."

CHAP. IV.—*Is the plague transmissible, in countries where it is endemic or epidemic, by merchandize suspected to contain pestiferous matters?*

It will be obvious that it must be very difficult to decide this point in places where the pestilence is indigenous, and where it is, therefore, liable to be developed spontaneously at any time; for what may be attributed by certain persons to handling some description of goods, may be altogether owing to the influence of an endemic cause. The case related by M. Sicard of Marseilles to M. Prus is unsatisfactory in several points of view, and nearly the same thing may be said of all the analogous examples which have been made public. It may, therefore, be very fairly set down that the transmissibility of the plague, under the circumstances mentioned, has at all events not been proved.

CHAP. V.—*Has the plague been observed, in epidemic foci, to be transmitted by the air being charged with pestiferous miasms?*—in other words, is the plague infectious through the medium of the atmosphere during the prevalence of an epidemic pestilence? Until of late years, the question of atmospheric *infection* had been altogether superseded by and merged in that of direct and immediate *contagion*. We need scarcely say that it can never be an easy thing to determine with exactitude the infectiousness of any disease, while a pestilential constitution of the atmosphere exists, and when consequently a whole population is exposed to the morbific influence. As we have previously remarked, scarcely a single person escapes *in toto* the effects of the malarious condition of the air; they are experienced by all to a certain degree during the prevalence of the epidemy.

We shall first enquire if the air of a plague-hospital has seemed to give the disease to those, who had most carefully avoided all contact with infected persons or objects. That great mortality occurred among the *pharmaciens* and attendants in the plague hospitals at Cairo and Alexandria during the pestilence of 1835, notwithstanding the use of all precautionary means to avoid direct contact with the sick, or of any thing belonging to them, cannot be disputed: of 20 pupils, that were sent from Abouzabel to the hospitals of Cairo, 19 caught the disease and died. The question then comes to be, was this mortality owing to the general epidemic influence, to local atmospheric infection, or to immediate contact with the patients? The best answer to this will probably be found by referring to what took place at Abouzabel itself—only a few miles distant, it will be remembered, from Cairo—when that place was attacked by the pestilence. The barracks of the sick were situated in the open country, at some

elevation above the plain, and well ventilated. Not one of the medical inmates or attendants, although in most frequent contact with infected persons and objects, suffered; and this too, be it remembered, in an epidemic focus. The free ventilation had prevented the formation of "a focus of infection." Dr. Laidlaw, the physician of the general European hospital at Alexandria, remarks most truly that "whenever a number of plague-patients are collected together in one space, they seem to create a pestilential atmosphere, unless free ventilation be employed." Hence the importance of never having many plague patients in one room or ward, and of maintaining a most thorough ventilation through every part of the building, which should always, if possible, be situated in an elevated open position and on a dry foundation, at a distance from stagnant water or any source of malarious exhalations. If these circumstances be not attended to, hospitals are apt to become positive foci of infection, and thus to increase rather than to diminish the general mortality.

That the disease, when it has attacked one of the inmates of a house, is, under certain circumstances, apt to extend to others who are dwelling there, cannot be disputed. Dr. Grassi tells us that, in 1835, no fewer than 57 deaths occurred in the house of Hingi Osman, the treasurer of the marine at Alexandria. This is only one out of many similar instances that might be quoted. The fair conclusion therefore seems to be, that pestilential miasms or effluvia emanate from the bodies of the sick, and that these powerfully tend to act upon the system of persons whom the epidemic influence has already made liable to the disease. Almost all the resident medical men in Egypt at the present time, who believe in the transmissibility of the plague, are of opinion that the transmission is effected in this way. Dr. Grassi is the only one who maintains that the disease is communicated by direct or indirect contact with the sick, without any intervention of atmospheric agency.

Remaining long in the chamber of the infected is the thing most to be avoided by the medical and other attendants. What Dr. Rigaud said to his friend M. Lesseps, the French Consul-general, who visited him constantly to the last moment of his life—"Do come and see me twenty times a day, but don't remain more than five minutes at a time in my room"—abundantly shews what his sentiments were upon this point.

By a singular perversion, the common practice in the East is to keep a patient in a close and confined apartment, with as imperfect a current of air through it as possible. What wonder then that a disease like plague spreads, wherever it makes its appearance: every sick chamber becomes a new focus of infection! There cannot, therefore, be a reasonable doubt that the diffusion and mortality of the pestilence are powerfully promoted by the contamination of the atmosphere with morbific emanations from the bodies of the infected.

Sometimes it happens that when a locality, which has contained a number of plague-patients, comes to be occupied by other persons (who may use nevertheless every possible precaution to avoid all contact with suspected objects), the disease re-appears to a greater extent among the new residents than can fairly be attributed to the sole agency of the epidemic influence which may be then existing.

In 1834 in the month of June, during the insurrection which broke out

in Judea, the insurgents pillaged and sacked Jerusalem. A number of Roman Catholics took refuge in the convent of St. Saviour in this city.

"At the end of ten or twelve days of close confinement, I remarked," says M. Delong, "cases of plague among this distressed population, huddled together in their dormitories, upon and under the stairs, in the courts and other chambers of this vast building. After twenty-five days of expectation, Ibrahim Pacha at length arrived, and the city was relieved. The holy Fathers, full of alarm, hastened to clear their dwelling of all this mass of people, and shut themselves up in most strict quarantine. What happened? Of all those who left the convent, three only died four or five days afterwards. But, out of 63 priests who thought to save themselves by isolation, no fewer than 22 died."

"Now," continues M. Delong, "what part did infection play in this instance? I will not positively decide. It seems however clear to me, that we should, in all similar circumstances, disperse the infected into different quarters, instead of shutting them up with others, as yet intact, in a confined locality where sanitary regulations have not always been attended to."

What occurred in the musical academy at Kanke in 1835 is still more deserving of attention:—

The plague having broken out in this school, although it was kept in the strictest quarantine, the pupils were sent into the desert, where they continued for upwards of a month. In the mean time, all the rooms were well cleansed and purified; and no person had remained in the building. Not one case of plague occurred in the desert: but no sooner had the boys returned to their old quarters, than several were taken ill; and each day several fresh cases were reported. Again were the boys sent into the desert; and again the disease ceased to spread. While they continued in the desert, 15 soldiers were employed to go daily to the village, where the plague was raging, for provisions; but none of these men caught the disease themselves, or gave it to the boys.

During this disastrous year, many striking circumstances similar to those now mentioned occurred in the military barracks, all of which had been put into strict quarantine. Although every attention was paid to cleanliness, they seemed to remain foci of infection whenever the disease had once shewn itself in them.

It will be obvious that the facts now mentioned, coupled with similar ones observed in epidemic foci and more especially on board-ship, must receive new and very useful applications in considering the question of Quarantine.

Admitting that morbific miasms are given off from the bodies of plague-patients, and thus render the surrounding atmosphere pestiferous, we have next to enquire whether these miasms are exhaled from the lungs, or from the surface of the body of the sick, or from both; and also when they prove infectious, whether they are (most probably) absorbed by the skin, the lungs, or in the way of deglutition. There can be very little doubt in the present day that very many cases, where the disease has appeared to be the result of direct contact with a patient or with any thing he has used, may fairly be regarded as examples of infection through the medium of the atmosphere. Dr. Bruyer has put this point very forcibly:

"A person finds himself affected with plague, although he has never left the house; straightway he tries to bring the mind where he was the night before, two or three days ago, the objects he touched, and so-forth. If he has not been

out of doors for one or two weeks, owing to indisposition, it matters little; he was out three weeks, a month ago; and as the virus may be retained for months, nay, for years, it is not surprising that the disease should have shewn itself. He will not for a moment consider that the skin is guarded by the double covering of the epidermis and of the clothes which he wears, and that therefore the virus can only with the greatest difficulty be transmitted from the exterior to the interior. As to pulmonary absorption, that is never spoken of. It is a received opinion among the Franks that the air is not, never has been, and never can be the vehicle of the plague. They refuse to believe that, in seasons of the plague, every individual breathes an air more or less deleterious, that the person who sees or touches an invalid is in the atmosphere of the invalid, and that when, by means of the air, a deleterious principle is conveyed into the minutest bronchial ramifications, and by the act of deglutition into the gastric passages, there is then much more than mere contact; for there is a real penetration in the first case; and, in the second, there is digestion and interior absorption. Infection therefore exists, in the strongest sense of the term; and the disease which it occasions is more or less severe, according to the quantity of miasmata introduced into the system, their intensity, and the individual predispositions or susceptibilities of those who have absorbed them."

The Academic Society of Marseilles, in the report which was unanimously adopted in August 1845, expressly recognises the following two propositions:—

"1. Writers, the most at variance in all that concerns the general history of the plague, are nearly unanimous in asserting that the simple contact of one individual with another is one of the modes of transmission the least favorable to the propagation of the pestilence.

"2. A lengthened stay in the atmosphere of the sick, and, above all, exposure to the pestilential miasms which contaminated objects exhale are highly dangerous."

The only difference, says M. Prus, which, upon this truly important point of doctrine, exists between the Academical Society of Marseilles and the Commissioners, may be thus summed up:—

The Academic Society asserts that the simple contact of individuals is one of the modes of transmission least favorable to the propagation of the plague.

The Commissioners think that no well-authenticated fact establishes the reality of such transmission. They are moreover not acquainted with any facts to authorise them to believe, with the Academical Society, in the dangers of miasms from contaminated objects.

The Academical Society and the Commissioners equally acknowledge that a lengthened stay in the atmosphere of infected persons, or, in other words, infection by pestilential miasms is that which is most to be feared.

Dr. Mead who, at the time of the plague at Marseilles in 1720, was ordered by the English government to draw up instructions for preventing, if possible, the introduction of the pestilence in England, and to arrest it if it was introduced, has much insisted upon the utility and necessity of promptly removing the sick from the seat of the infection, and transporting them to some distance.*

* R. Mead, M.D. *A short Discourse concerning Pestilential Contagion.*—London, 1720; and *De Peste Liber*, 1723.

He has mentioned as worthy of imitation the course pursued at Rome, during the plague of 1657, by Cardinal Gastaldy, at that time invested with full power to take every sanitary measure which he judged proper.

The Cardinal prohibited any infected person, and even any person in health who was suspected, to remain in their houses. They were promptly taken to the hospital, built on the island which divides the Tiber. With respect to those who had occupied the same house, they were placed in other hospitals near the city, from whence they were removed into the island if the disease shewed itself. During this time, the Cardinal was very careful to have all the furniture taken out of the infected houses, exposed in the open air, and the apartments left open, in order to purify them.

By these means the Cardinal, in two months, caused the plague to cease, after it had raged at Rome for two years.

But that which deserves most attention, adds Dr. Mead, is, that, before these regulations, it was constantly observed that the disease rarely appeared in a house without attacking all its inhabitants; whereas, after they had been put in force, scarcely five out of a hundred of those who were removed from the proximity of the infected, were subsequently attacked with plague.*

Muratori informs us that similar measures had been adopted with equal success at Ferrara, in 1630.†

The Board of Health at Constantinople has, for the last eight or nine years, followed out the prophylactic method recommended by Gastaldy and Mead, removing the infected to a hospital, and emptying every house, in which a case occurs, alike of its inhabitants and furniture, having it well cleansed and purified, and not allowing any one to occupy it for the space of a month. It is to the adoption of these means that the Board attributes the exemption of Constantinople and the principal ports in Turkey from the plague, since the year 1839.‡ If, in place of acting in this manner, the houses of the infected were condemned with their inmates to a severe quarantine, the result would necessarily be to create fresh foci of pestilential infection, and thus increase the very evil that is vainly sought to be extinguished.

M. Seisson, principal physician to the hospital at Cairo and formerly professor of the School of Medicine at Abouzabel, observes that if, at the time of the appearance of the plague at Cairo, in 1835, after the arrival of the Maltese Giglio, who died of that disease which he had brought from Alexandria, they had dispersed the other members of his family in the country, it would probably have prevented the death of eight or ten persons who, kept by military force within the house, contracted the plague and died. Two persons fled from the focus of infection, of which the quarantine was the cause; they both remained free.

The case of Giglio, adds M. Seisson, does not prove, as it has been said, the contagion of the plague; it only proves the danger of shutting up, in a narrow space, individuals who have been in connection with an infected

* Gastaldy, *Tractatus de avertendâ et profligandâ peste.* Bologna, 1684, folio.
† Muratori, *Governo della peste et delle maniere di guardarsene.* Modena, 1714, 8vo.
‡ The correctness of this conclusion has been questioned by not a few experienced observers.—G. M.

person. It is therefore of the first importance to abolish what are called special quarantines for houses, in which persons have been seized with plague. On the contrary, they should be at once emptied, aired, and purified, to prevent every focus of infection.*

Dr. Mead has quoted from Gassendi a passage, wherein this author attributes the frightful mortality of the pestilence that prevailed at Digne in Provence, in 1629, to the severe measures that were taken to prevent the inhabitants from leaving the town and retiring into the neighbouring country.

In 1720 the inhabitants of Marseilles were prohibited, under pain of death, from leaving that city or its suburbs! Hence, doubtless the terrible devastation that ensued.

"And yet," says M. Prus, with an emphatic force of argument that cannot fail to make a deep impression on the public mind, "what would be done in the present day according to existing regulations, if the plague made its appearance in any town of France? It would be isolated by a cordon of troops, for the purpose of preventing any of the inhabitants leaving it; in other words, the unfortunate town would be condemned to retain, and in a concentrated form too, within its bosom all the various causes which serve to develop foci of pestilential infection. Is it then impossible to reconcile the advantages of the public health with the most common laws of humanity? We think not; on the contrary, we are firmly convinced that perfect security may be given to neighbouring towns and to the whole kingdom, by taking the necessary measures to remove the great majority of the inhabitants of the town, in which the plague should appear, from the danger. To obtain results so desirable, it needs only to know how to profit by all that time and experience have taught us of the epidemicity of the disease and of pestilential infection."

Conclusion.—"In epidemic foci, the plague is transmissible by the miasms which emanate from the bodies of the infected, and by the foci of infection thereby produced."

CHAP. VI.—*Is the plague transmissible beyond, or away from, epidemic foci?*

This, it will be perceived, is the most important of all the questions respecting the history of the plague, in reference at least to the subject of Quarantines; for, upon its solution, the propriety of making any change in existing regulations must depend.

A considerable number of medical men, who have studied the epidemics of 1835 and 1841 in Egypt, answer it in the decided negative, and for the following reasons:

When the epidemic constitution ceases, all or nearly all the sick recover, and no new attacks occur.

Numerous plague-patients have been, and still are, accumulated in the hospitals and houses; all the conditions favorable to the transmission of the plague by mediate or immediate contact, or to its propagation by miasmatic infection, continue to exist together; and yet, at a period that is almost known and determinate, the epidemic becomes extinguished, and with it the plague ceases entirely.

* M. Seisson. *Lettre addressée au consul-general d'Angleterre à Alexandrie en* 1839.

An infected person coming from an epidemic focus is now not more to be feared than a sporadic plague-patient, who, by the consent of all the medical men in Egypt, never occasions any risk.

If it is doubtful whether the clothes and goods of infected persons can transmit the plague in the time of an epidemic, it is certain that, when once this has disappeared, such clothes and goods may be used with impunity.

An epidemic only appears in a country in the train of certain local and atmospheric influences, whose action has been prolonged for a greater or lesser period of time; very commonly too, privations, fatigues, physical or moral troubles have been experienced, in different degrees, by the inhabitants. From these united causes result more or less general predispositions to contract the prevailing disease. Now, when a vessel carries one or more infected persons beyond the focus of infection, she cannot take along with them all the causes, past and present, which are necessary to the development of an epidemic.

It must be confessed that the observations, made in Egypt during the years 1835 and 1841, seem to justify these propositions and the conclusions which flow from them.

Let us now see whether the facts observed on board vessels at sea, and in the Lazarettos of Europe, are in accordance with these conclusions.

Since the year 1720 down to the present period, 25 vessels having the plague on board, have arrived in the ports of France or Italy; 10 at Marseilles, 5 at Venice, 8 at Leghorn, and one at Genoa. We shall confine our remarks to the circumstances connected with the arrivals at Marseilles, the official documentary evidence upon these being much more complete than in the other cases. The years in which these arrivals occurred in 1741, 1760, 1784, 1785, 1786 (*bis*), 1796, 1819, 1825, and 1837. The entire number of cases of plague (omitting all the doubtful ones), treated in the lazaretto of this port since 1720, is 32; and of these, 18 have proved fatal. Three of the quarantine surgeons caught the disease during their attendance on the infected; they all recovered. A fourth surgeon, who had arrived on board an infected ship, and subsequently acted in his professional capacity in the lazaretto, died. Four of the health-guards, who had been (most improperly) put on board infected ships, contracted the disease in the lazaretto; two died. A sailor, who acted as assistant in the lazaretto infirmary, was taken ill and died. Two other sailors, belonging to an infected vessel, but who seemed to have caught the disease in the lazaretto where they had been confined for more than 12 days, died.

In the 11 cases therefore of plague, which might have been contracted in the lazaretto, 6 of the patients recovered, and 5 died: all the latter cases occurred in men who had been on board infected vessels. Of the three health-guards, who had caught the disease on board, only one recovered. Indeed it would seem that, in all the fatal cases, the patients had been for a longer or shorter period of time on board infected vessels.

It appears, also, that not one of the cases, which occurred on board a vessel at sea during the voyage to France, recovered;—a circumstance that very emphatically shews the malignancy of the disease when it occurs in a crowded confined space, and the great advantages of treating it in a large open lazaretto.

From the facts now alluded to, we are surely justified in maintaining not only that the plague may be transmitted on board-ship among individuals coming from the same infected focus, and living in the same hygienic conditions; but also that a plague-patient, received into a lazaretto in another and distant country, may become the cause of infection to others. The *conclusion*, therefore, of the Commissioners is this:

"It is indisputable that the plague is transmissible beyond or away from epidemic foci, whether on board vessels at sea, or in the lazarettos of Europe."

The question proposed in Chap. VII. is to this effect: *Is the plague transmissible, away from epidemic foci, by immediate contact with the infected?* It is at once answered in the negative; there is not a single authentic case on record to prove that the disease has ever been propagated in the way mentioned. The same thing may be said in answer to the question in the following Chapter, viz: *Is the plague transmissible, away from epidemic foci, by the clothes or other effects which have been used by the infected?* Instances indeed have been related, by some writers, of passengers appearing to be taken suddenly ill almost immediately after opening their bags or boxes, and handling their contents; but not one of the narratives of this sort is satisfactory in its details or conclusive in its evidence. Nevertheless the Commissioners, unwilling to commit themselves unqualifiedly on the point under consideration, suggest that new experiments and observations should be made with all possible precautions, at a distance from every focus of infection, and in a locality where the plague is not endemic.

CHAP. IX.—*Can articles of merchandize transport the plague beyond or away from epidemic foci?*

The evidence and facts, on which the advocates (few in number as they are in the present day) of the affirmative side of this question chiefly rest their opinion, are the following:

The plague of London in 1665 is said by Hodges to have been imported from Holland into England in bales of cotton. But it may be fairly objected to this opinion, that the registers of that city clearly shew that the disease had been endemic within its walls for some years preceding the outbreak of the great pestilence, and the destructive conflagration that occurred immediately afterwards. Since that period, the plague has never reappeared in the English metropolis.

The testimony, that has been adduced to shew that the plague of Toulon in 1721 was owing to the reception by some of the inhabitants of some suspected silk that was stolen out of quarantine, is equally unsatisfactory. These and such-like statements cannot be fairly admitted, in the present day, to be entitled to much weight in the determination of the important question under enquiry. We are not sufficiently acquainted with the accompanying circumstances of either case to warrant us in laying much stress upon them. Does the following fact,—the details of which may be relied on as in every respect authentic and perfectly accurate—communicated by Dr. Laidlaw to the English Consul at Cairo, enable us to form any thing like a decided opinion?

In 1835, the epidemic plague raged at Alexandria among all the servants and employés living in the magazines of the Egyptian government.

Notwithstanding this, a vast number of bales of cotton, daily handled by the prisoners, were exported from January to June—that is to say during the whole continuance of the epidemic—to all the great ports of Europe.

There were exported this year

To England	31,709	bales.
To Marseilles	33,812	„
To Leghorn	424	„
To Holland	150	„
To Trieste	*32,263	„
To other ports	32	„

Now, although no precautionary means were taken in the way of disinfecting this immense quantity of an article that has always been deemed highly susceptible of retaining the infectious effluvia, not one person seems to have been infected in consequence.

Of sixteen English vessels laden with cotton, which sailed from Alexandria from the beginning of January to the end of June, eight had the plague on board; and yet their cargoes did not prove more dangerous than those of the non-infected vessels.

Besides this very conclusive evidence, the Commissioners mention upon official authority that, since the year 1720, not one of the porters employed at the lazaretto of Marseilles in discharging and landing the cargoes of suspected ships has ever caught the plague.

The *conclusion* is therefore fairly forced upon us that

"There is nothing to prove that articles of merchandize can transport the disease beyond epidemic foci."

The division of objects of merchandize in the French lazarettos into three classes, according as they are (believed to be) susceptible, doubtfully susceptible, and non-susceptible of infection, is the most arbitrary and ridiculous thing imaginable; nor is it easy even to form a conjecture what possibly could have led any set of reasonable men to adopt it. Tallow and wax, for example, are declared to be non-susceptible objects; but when made into candles (from the wicks, we suppose), they are susceptible! Pieces of old copper and other metals are conductors of the pestiferous poison; wood and other porous substances are not! Truly, as M. Prus remarks, the classification can only be regarded "as the result of most imperfect observation and of antiquated traditions prompted by fear and prejudice." It is utterly discreditable for any enlightened government to retain and act upon it.

The great point is to determine whether the clothing and baggage of plague-patients are capable of communicating the disease in our ports. If the decision upon this subject be in the affirmative, then certainly it will be right to ascertain what other objects possess the same property; but should it be in the negative, it is scarcely necessary to say that the entire catalogue of interdicted articles must be swept away.

It is quite unnecessary, as a matter of course, to say a single word respecting the comparative value of different modes of disinfection that have been proposed at different times. Most of the substances used in fumigation are utterly worthless; some of them are dangerous, and therefore inexpedient. Chlorine and its preparations are unquestionably the safest and best.

Conclusion.—" The study of the means best fitted to disinfect baggage, clothes, and articles of merchandize, remain still to be made.

" To be rational, before researches on this subject are undertaken, it should be proved that these different objects are really capable of becoming charged with the principle of the plague."

CHAP. X.—*Can the plague be transmitted by pestilential miasms, beyond or away from epidemic foci?*

When, on board-ship or in a lazaretto, the plague is communicated from an infected person to one in health, it is obvious that it must be always difficult, and often impossible, to say positively that the disease has been owing to direct contact with the sick; for, whoever has been so near a patient as to have touched his body, must have inspired the pestilential atmosphere that is around him. How, then, shall we decide whether the infection has taken place by the skin or by the lungs? The task is indeed not easy, if indeed it be possible. But if we consider, on the one hand, that numerous observations have clearly shewn that immediate contact with plague-patients have not given the disease, and, on the other hand, that residence in a focus of pestilential infection, but without any contact with the sick, has imparted it, we are surely almost compelled to admit the following *conclusions*, viz.

" 1. The transmission of the plague by pestilential miasms is a proved fact.

" 2. The transmission of the disease by immediate contact with the infected is not a proved fact."

It has been already seen, from the experience of the Marseilles lazaretto, that, whenever there was plague existing in a ship, the stay of the vessel in the port became dangerous not only for the crew and passengers, but also for the health-officers who were sent on board, and who, it will readily be believed, most carefully avoided all contact with the sick or with any suspected object. Too often, the vessel becomes a genuine "focus of pestilential infection." The air, loaded with the miasms that always emanate from the bodies of the sick, acts as a poison to all who inhale it. This infected state of atmosphere on board a vessel may continue for some time, after every plague-patient has been removed from on board. We are therefore fairly warranted in concluding that " the plague is transmissible by infection (in other words, by the atmosphere being charged with pestilential miasms from the bodies of the sick) beyond or away from epidemic foci, as we have already seen that it is so in epidemic foci, and in countries where the disease is endemic."

To this general conclusion it may be useful to append the following three, which are but as corollaries from it, as upon each of them certain quarantine measures are based.

" 1. It follows from the facts adduced in the preceding chapters relative to the transmissibility of the plague, alike within and at a distance from epidemic foci, that plague-patients, by vitiating the air of places wherein they are confined, may create foci of pestilential infection that are capable of transmitting the disease.

" 2. Foci of pestilential infection may persist in a place after the removal of plague-patients from it.

" 3. Foci of pestilential infection once formed in a vessel, by the presence of one or more plague-patients on board, may be transported to great distances."

CHAP. XI.—*Is sporadic plague transmissible either by the infected themselves, or by foci of infection which they may form?*

This question has already received a partial answer; but it will be useful to recur to its consideration in this place. The grounds, upon which almost all the medical men in Egypt have adopted a negative opinion on the matter, are as follow.

After the epidemic of 1835 had ceased, the attention of these gentlemen —divided, be it remembered, in opinion as to the general question of the transmissibility of the plague—was naturally directed to the sporadic cases which occurred in the latter half of that year, and also in 1836, 37, and 38. From June 1835 to the end of December 1838, 649 cases of sporadic plague were observed in Alexandria. Now it is admitted by all that, of these 649 cases, 646 did *not* transmit the disease to any of the persons who had waited upon, and had frequently touched, the sick. It is therefore in reference to the three remaining cases only that any difference of opinion has existed; and with respect to these three cases, we think that no unprejudiced reader will hesitate to say, after carefully perusing the reports, that they are very far from proving that the disease was communicated, in a single instance, from one patient to another.

Here it deserves enquiry whether the cases of plague that have at any time been imported into Europe have, or have not, been brought by vessels which had left the producing countries of the disease, while a pestilential *epidemic* was prevailing. The imported cases of the plague have never, we believe, been sufficiently considered in this point of view, although it bears very obviously on the question of the transmissibility of *sporadic* plague. The examination of the histories of the ten importations of the plague into Marseilles since 1720 has led the reporter to believe that, in every one of these instances, the pestilence was raging epidemically in the ports whence the vessels had come. This interesting fact certainly does not prove that sporadic plague is not transmissible; it only shows that none of the numerous vessels, which have left Egypt, Syria, or Turkey since the year 1720, at a time when these countries suffered only from sporadic plague, has ever imported the pestilence into Marseilles. This consideration, coupled with the remark of intelligent and trustworthy observers in Egypt that the cases of sporadic plague, which have occurred from July 1835 to the beginning of 1839, have in no instance transmitted the disease, deserves the serious attention of all medical men and legislators. M. Brayer also has come to the same opinion respecting the sporadic plague at Constantinople.

Conclusion.—" Patients affected with sporadic plague do not seem to be capable of producing foci of infection sufficiently active to transmit the disease."*

CHAP. XII.—*Is the plague more or less readily transmissible according to the intensity of the epidemic, the different periods of its course, and the or-*

* In a subsequent part of the Report however, when treating of quarantine restrictions, it is rather strangely stated that "the non-transmissibility of sporadic plague is not yet sufficiently determined by experience to warrant us in founding a sanitary measure upon it."

ganic susceptibilities of the individuals exposed to the action of pestilential miasms?

There cannot be a doubt for a moment that different epidemics, of this as well as of other pestilences, exhibit very different degrees of intensity or malignancy, as evidenced by the varying amount of mortality produced in different seasons. Now, a question here arises, whether the risk of infection is at all proportionate to the degree of this malignancy. It will be obvious that it is scarcely possible to determine this point within the range of the general exciting causes of the pestilence, or, in other words, within the circuit of the epidemic focus. The observations, to be at all satisfactory, must be made on cases occurring beyond, or at a distance from, such a focus; for there, the miasms exhaled from the bodies of the sick will operate alone. The results of past experience seem unquestionably to indicate that the liability of such cases to propagate themselves is in direct relation with the intensity of the epidemic, at its place of origin. The greater this intensity, the more readily the disease is communicable; and the reverse holds true, in proportion as this intensity diminishes. When the plague ceases to be epidemic, its transmissibility appears to cease altogether.

The period, too, of the epidemic has a decided influence on the force of the transmissibility of the disease. We have already considered this point, and need not dwell upon it here.

What has been said respecting the period of the epidemic in this point of view, is equally true of the period of the disease. Larrey was of opinion that the plague was not communicable during its first period or stage. Dr. Lacheze maintains that the disease ceases to be so after the second stage; that is, after the fourth or fifth day from its invasion. In the case of the disease, as in that of the epidemic, it is the second period which is most dangerous. Moreover, the influence of the organic dispositions or susceptibilities of individuals, in other words of their general state of health and their idiosyncrasies, either in promoting or in counteracting the liability to infection, cannot be disputed by any one. Much unquestionably depends upon the hygienic regime that is followed. Whatever tends to enfeeble or deprave the powers of life, renders the system more liable to infection. Hence excessive fatigues, the want of proper nourishment and the abuse of spirituous liquors on the one hand, and luxurious dissipation and excessive venery on the other, are all powerfully predisposing causes. Larrey observed that any tendency to the scorbutic diathesis rendered the system unusually susceptible, and that all such cases proved very rapidly fatal. We have already seen that race, nationality, sex, age, the circumstance of being acclimated or not, &c. have all some influence in aiding, or otherwise, the tendency to be affected by general epidemic causes. The same is the case with respect to the action of pestilential miasms.

CHAP. XIII.—*Is there reason to believe that the plague, when imported from the East into any European port, may be communicated to a sufficiently large number of persons to give rise to a pestilential epidemic?*

The medical men of Egypt answer this query in the negative. Their opinion is based on the often observed fact that, when plague-patients are transported to places not subject to the pestilential constitution, they

die or recover without transmitting their disease to any one. If the infected, as we have seen, cannot communicate the disease to the inhabitants of certain places in Upper Egypt, how shall we believe that, when transported from Egypt to France, it will possess a power of transmission so strong as to occasion an epidemic?

Some observers—and Dr. Lacheze is of this number—have indeed remarked that, in certain cases and in certain localities not subjected to a pestilential constitution, the disease has been communicated to a few individuals; but that these latter in no instance transmitted it to any one, notwithstanding the most free and intimate intercourse. Dr. Lacheze does not admit that the plague can ever, without a pre-existing epidemic influence, attack a sufficiently large number of persons to constitute a public calamity; and he insists that, wherever it has committed great ravages, there has uniformly been a pestilential constitution prevailing at the time. Sydenham, too, was of this opinion; for we find it distinctly asserted in his writings that, however frequent the importation of the plague might be into England, the disease would assume an epidemic character only every thirtieth or fortieth year; because, then only, would it find the atmospheric conditions and the organic predispositions that are favorable to its development and propagation.

This doctrine is very generally received in Egypt in the present day, and its truth has already been recognised by many of the most intelligent physicians in Europe. The legitimate inference from its public recognition would be that vessels arriving from infected ports, and having the plague on board, might be permitted to land the sick at any place not subject to the epidemic pestilential influence, without any risk to the people of that place, whether the patients recovered or not. But then it must be remembered that, until we are better acquainted than we are yet with what are the conditions of the soil and the atmosphere which, in Europe, may give rise to a pestilential constitution, and what is the meteorological condition in which an imported plague may be liable to become diffused, prudence will authoritatively require that the very same measures should be taken in the ports of France against the possibility of the propagation of the pestilence by the infected, as if there was no room for doubt that they may become the cause and starting-point of a pestilential epidemic.* This caution is more particularly necessary in the case of Marseilles than of any other place in France, in consequence of its many local sources of insalubrity.

This great sea-port presents—in the circumstances of its climate, of its harbour being choked with filth of all sorts and containing an admixture of salt and fresh water, of its large working population, of its being hemmed in on all sides by mountains which prevent the free circulation of the air, and lastly of its proximity to large ponds—the very conditions that are favourable to the development of the plague.† It is a remarkable thing

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* This is one of the conclusions of M. Prus, the justice of which has very fairly been impugned.—G. M.

† *La topographie medicale de Marseille, par M. Ducros, medecin en chef de l'Hôtel Dieu de Marseille*, 1837.

that the two cities of Europe which, after Constantinople, have suffered most from this pestilence are Venice and Marseilles :—Venice, which by its lagunes, its filthy canals, the moist heat of its climate, and by the wretched state of a large portion of its inhabitants, combines most of the causes which engender spontaneous plague, and may therefore, *a fortiori*, promote the diffusion of the disease when imported; and Marseilles, which in this respect approaches far too near to Venice.

Here we must not fail to remark that sufficient attention has not hitherto been paid to the cases, certainly very numerous, where the plague conveyed to a country has become spontaneously extinguished, for very want of being able to transmit itself. It would be very useful to ascertain with precision what are the local causes, which appear to resist the transmission and propagation of the disease. This work has only just been commenced in respect of a few places in Upper Egypt.

Conclusion.—" If it has been proved that the existence of a pestilential constitution in a country, into which the plague is imported, is necessary for the transmission and propagation of the disease, it seems nevertheless certain that imported plague will not exercise any great ravages, if it does not meet with, in the character of the climate, atmosphere and population of the place, the conditions that are favourable for its development."

Fourth Part.

What is the ordinary or exceptional term of the incubation of the plague? —in other words, how long may the plague remain hidden, so to speak, in the system of an infected individual, before it manifests itself by more or less distinct symptoms?

This period is believed to vary considerably according to the stage of the prevailing epidemic, and other less influential circumstances. The variations are nevertheless confined within certain limits, which it is important to ascertain; for upon them should depend, in a great measure, the duration of quarantines.

All observers have remarked that, when a pestilential epidemic commences in a town, the incubation of the disease is often extremely short. We read of attacks of the plague proving fatal within a few hours, nay within a few minutes: these are the cases, which have been aptly called " pestes foudroyantes."

In the second period or stage of the epidemic, the usual term of incubation is from three to five days. It is about the same in the third stage.

Upon all these points there is little or no discrepancy of opinion. It is only when we endeavour to determine the longest duration or lapse of time that may be fairly admitted for certain exceptional cases, that we find the statements of different writers to disagree. Some, and these constitute the large majority, maintain that the term of incubation never exceeds eight days; others think that this term may be prolonged to ten days, and sometimes, although very rarely, a few days more. Dr. Grassi, in his reply to certain interrogatories addressed to him in 1839 by the English minister, says upon this subject:

" In the course of several years, some thousands of persons of every age, sex and condition, were condemned to undergo a quarantine of observation of six days for having been exposed to infection. The disease made its appearance in many of them during their isolation, but in no one case beyond the sixth day. This is an observation which I have made with great attention."

On his representations to the Egyptian government, the quarantine, which had before been eleven days in the lazaretto at Alexandria, was reduced in 1842 to seven days.

The experience of other medical men in Egypt has, on the whole, confirmed the truth of M. Grassi's observations.

This gentleman assures us that, among the multitude of people that left Cairo during the epidemic of 1835 and fled into Upper Egypt, which continued healthy, the disease manifested itself in a few persons; but, in no one instance, more than the eight days after their quitting the city.

The observations made, in the course of the same year, by the professors of the medical school at Abouzabel lead to the general conclusion, that the period of incubation never exceeds six days. According to M. Segur, it is never more than eight. If, too, we examine what has occurred in vessels that have had plague on board after leaving an infected port, we shall find that on every occasion the disease has shown itself within eight days from the time of sailing.

With respect to those cases where it has been alleged that the period of incubation exceeded eight or ten days, M. Prus does not consider them at all worthy of acceptance, in the sense in which they have been adduced; for no account has been taken by their narrators either of the epidemic influence, or of the miasmatic infection which always acts an important part in places that are badly ventilated; in a ship for example. When a vessel becomes a focus of infection in consequence of having had a number of plague-patients on board, the persons, who remain in this focus and breathe the vitiated air, may, and often do, contract the disease at intervals of a longer or shorter space of time. It is obvious that, under such circumstances, the sailors and passengers may be seized 15, 20, 30 days and even upwards, the one from the other, without the inference being at all warranted that the Incubation of the malady has existed in any one case for more than six or eight days. We, in truth, cannot make out when the pestilential miasms began to act on those who had received them into their systems, in such a manner as to occasion the development of the disease.

Conclusion.—" If it be true that a fixed and absolute term cannot be assigned to the incubation of the plague, it seems, nevertheless, to be clearly proved by well-established facts that, at a distance from countries where it is endemic and beyond or away from epidemic foci, the disease has never broke out in persons who have been exposed to its influence after an isolation of eight days. The few facts, which might be regarded as exceptional to this rule, are all susceptible of another interpretation."

The concluding part of the Report is occupied with an account of the Quarantine regulations now in force in the different ports of France on vessels arriving from suspected countries, and of the changes which the Commissioners propose should be adopted. We have no intention to allude to the first of these matters; and, with respect to the second, our remarks shall be very brief.

It is suggested, and the suggestion is certainly a valuable one, that medical men should be appointed by Government to reside in the different places where the plague is most apt to exist, in order that regular reports as to their sanitary condition might be transmitted home, and for the purpose of officially examining the state of every vessel, with respect to her passengers, crew, cargo, accommodations, &c., about to leave the country for any French port. The resident consular agents would then be better qualified, by the accurate professional details thus acquired, to determine when to grant and when to refuse clean bills of health to the vessels of their own nations. The affixing of the medical certificate to the ship's bill of health would also enable the officers of the port, where the vessel arrived, to judge more correctly of all the circumstances connected with her past and present condition. The Commissioners propose that no clean bill of health should be granted when a pestilential epidemic prevails or appears to be impending in the place of departure, or even when the number of sporadic cases of the plague are so numerous and severe as to occasion apprehensions that the malady may spread. In all other cases, a clean bill might be granted at the port of departure.

Although believing that the clothes and other effects of the sick are not capable of transmitting the plague, the Commissioners suggest that, until further experiments are made upon this subject, all those articles should be duly ventilated during the voyage; or, what would be better, that the trunks and boxes of the passengers and crew should be secured and stamped (plombées) at the port of departure, and not be opened until this can be done in a French lazaretto, where they should be well ventilated for three days or so.

The following are the suggestions of the Commissioners in respect of the Quarantines which they deem advisable, in lieu of those now existing in French ports.

1. For vessels having a medical man on board, and coming from Egypt, Syria, or Turkey with a clean bill of health, the quarantine to be 10 full days, *to date from their departure*, provided no case of plague or of any suspicious disease has appeared during the voyage.

The quarantine to be 15 full days, *to date from their departure*, for the same vessels arriving with a foul bill of health, if neither plague nor any suspicious disease has occurred on board during the voyage.

2. For merchant vessels arriving with a clean bill of health, but having no medical man on board, a quarantine of observation to be for ten full days, *to date from their arrival*.

When the same vessels shall arrive in a port with a foul bill of health, but without having had either plague or any suspicious disease on board while at sea, a most strict quarantine to be for 15 days, *to date from their arrival*.

If a case of plague, or of suspicious disease has occurred on board during the voyage, or should occur after the arrival of the vessel in a French port, the vessel to be subjected to a rigid quarantine, the length of which to be determined by the sanitary authorities of the port. The passengers and crew to be transferred to the lazaretto, and detained for 15 days at least, and 20 at most; the cargo to be unloaded and freely exposed to the air; the vessel herself to be well cleansed out, purified, and left

empty for a month at least; and health-guards to be stationed near to, but not to be put on board of, the infected vessel.

With respect to the cargo, since it has not been proved by any authentic fact that articles of merchandize have the property of retaining pestilential miasms, and of transmitting the plague, the Commissioners confine themselves to merely recommending the employment of such means as are most simple and least oppressive or vexatious to commerce.

After exposing the barbarous absurdity of the plan followed at the Marseilles lazaretto, even up to the present day, in the treatment of any one affected with, or supposed to be affected with, plague, it is suggested not only that plague-patients should be treated and waited upon like any other patients, without using the cruel and ridiculous precautions that are still in force, but also that *post-mortem* examinations should be made in all fatal cases.

Should the plague break out in any house, town, or district, the rules to be followed are simple and obvious. The sick should be immediately removed from the dwelling, where the disease has appeared, to a healthy well-aired spot that has been fixed upon; while all the other inmates also should be compelled to leave it, in order that it may be duly cleansed, purified, and ventilated. On no pretext, should the infected be confined and inclosed along with the healthy by sanitary cordons, or other compulsory measures, in the very place where the pestilence exists; this were only aggravating the mischief and rendering it more concentrated. The great object should be to attenuate the virulence of the atmospheric poison by separating the sick from the healthy, and by keeping both in airy, elevated, situations. If necessary, tents and simple barracks should be established, and the healthy be compelled to dwell in them, at a distance from the focus of infection.

The Report, of which we have now given so extended an analysis, was elaborately discussed at eight or nine sittings of the Academy of Medicine, in the months of May, June, July and August. Notwithstanding the labour expended, we do not think that either much new matter was added to the details which the Report itself contains, or that any of its more important positions were successfully impugned. The majority of the speakers, as well as of the members of the Commission, declared their cordial concurrence with the results of M. Prus' researches, while the minority were divided into two sections that maintained very opposite opinions; the one advocating nearly all the extravagant notions held by the ultra-contagionist party, and the other loudly proclaiming the non-communicability of the plague under almost any circumstances, and calling for the entire abrogation of all quarantines. The reader will be able to judge for himself of the value of the opinions of both of these parties.

By far the most valid objection to the Report is, that the practical recommendations, proposed in its concluding portion, are not altogether consistent with the doctrines professed before; the quarantines recommended are unnecessarily stringent and severe, if the conclusions in the body of the Report be correct.

On the whole, however, the labours of the French Commissioners are deserving of the very highest praise, ; and we should be doing injustice to our own feelings if we did not again express our grateful admiration of

M. Prus' industry, good faith, and sound discriminating judgment in the execution of his arduous and responsible task.

We now proceed to notice the result of the steps which the British Government took, in the course of the year 1844, to collect authentic information upon the questions which Prince Metternich considered to require solution, before the meeting of the delegates from different European powers could advantageously take place. It would, indeed, have been gratifying to our professional, as well as our national, pride, if we could have pointed to a work commensurate, in point of merit and importance, with the Report which has been submitted to the attention of our readers. But there is no Royal Academy of Medicine in this country, to which our Government can apply upon such great questions as that under consideration. Would that there was! For assuredly the unconnected enquiries of different individuals, although aided with all the advantages of official privilege, are not likely ever to have that completeness of detail and general comprehensiveness of character which we look for in the well-considered report of a competent public body.

In October, 1844, Sir William Pym was dispatched to visit all the ports in the Mediterranean, where lazarettos and quarantine establishments exist, and to obtain information upon every subject connected with them.

After describing the various places which he visited, and briefly mentioning the quarantine regulations that exist in each, Sir William makes the general remark that "the periods of Quarantine both as to the persons and merchandize may be very considerably reduced, particularly with reference to vessels arriving from places with clean bills of health, and in some instances altogether abolished, such as upon vessels from the Black Sea and those crossing the Atlantic; and that many of the unnecessary, vexatious, and expensive regulations, more particularly in the Italian States, may be discontinued."

As a matter of course, Sir William takes it for granted that the plague is contagious (communicable by contact, we presume), and that the contagion may be transmitted not only by the sick themselves but by various *fomites*; for we read that "it will be necessary to decide upon a list of articles of merchandize that are supposed to require purification, under the impression that they have been contaminated by persons having the plague, and the period of time required for their purification, together with the best means of doing so. To effect this, it may be necessary to examine practical men from different lazaret establishments, the superintendants of quarantine, captains of lazarets, and the medical men attached to these establishments." Some of these parties here named are not, we fear, the most likely to come to very sober decisions upon the points under consideration; they are contagionists *par metier*.

The date of Sir Wm's letter, from which these extracts are taken, is June 1845. His next letter, dated September of the same year, is occupied with answers to the three questions or points of enquiry mentioned by Prince Metternich in his reply to Lord Aberdeen's invitation. To the *first* on the list—as to the minimum and maximum of the terms of quarantine necessary for persons—Sir W. gives the following reply:—

"It appears to me that this question, and the one of greatest importance in this enquiry (the incubation of plague in the human system), was decided by the almost unanimous opinion of eighteen medical men in the Levant, by their replies to queries as published in the Parliamentary Papers; all of them, however much they differed in opinion upon the subject of contagion, agreed upon the short period of incubation, viz. from three to ten days, with one exception, Dr. Floquin, of Smyrna, who put down fifteen days as the maximum; and the opinion of those medical men is confirmed by the inclosed valuable document. No. 1, being a return of 5240 individuals who had undergone the *spoglio* in the lazaret of Alexandria in the course of four years, out of which number forty-three were attacked with plague, and all of them before the eighth day after the operation of *spoglio*."

The answer to the *second* question contains an admission that is so truly important, in a commercial as well as in a medical point of view, that we request our reader's special attention to it:

"It is difficult to obtain any decided evidence upon this question, as during my Quarantine mission *I could not ascertain that any one case of plague had been produced in any one of the various lazarets that I visited, in consequence of the manipulation of merchandize*;* and as in the principal lazarets in the Mediterranean (Marseilles and Malta) they have gradually abolished the *serenos* (probationary airings), and reduced the period of depuration of goods with foul bills to twenty-one days, it does not appear that this period could be further reduced with such cargoes as cotton, if exposure to the atmosphere is to be considered necessary; as it will take the full time, according to the present practice of opening first one side of the bale for a certain period, then making up that side and opening the other for the same time, making in fact the quarantine upon cotton only ten days, which last period will be sufficient for small cargoes or parcels of merchandize, which can be at once opened and exposed to the air."

On the *third* point—as to the best means of disinfecting objects susceptible of contagion—Sir W. very naively remarks; "from what I have stated as to the non-appearance of plague in any one instance from the manipulation of merchandize in Lazarets, the present practice of exposing goods to the atmosphere for a certain period, appears to have been attended with success." He seems never to have even so much as dreamed of the possibility that the goods possessed no contagious property whatsoever; and yet, strange to say, he was aware, all the while, that not a single instance could be produced of the plague having been ever communicated by the manipulation of merchandize, in the lazarets which he visited! Such are the blinding effects of old deep-rooted prepossessions on the mental vision even of the most experienced observers.

The following brief notice of the vessels which have arrived at Malta with the plague on board, and have been duly depurated in the lazaretto there, since the island has been in possession of Great Britain (not including the plague of 1813), will be found to contain some interesting particulars, serving to illustrate and confirm several of the most important positions in the French Report. The details—derived from the Parliamentary Correspondence, published this year—will not be deemed tedious or unneces-

* Mr. Turnbull, our consul at Marseilles, states that though the coast of France there is peculiarly liable to contagion, supposing contagion to exist, and though vessels are almost daily arriving from plague countries, there has been no instance of any expurgator having taken the plague since 1720.

sary by any who wish to understand thoroughly the important subject under consideration.

1819.—A Maltese vessel, laden with oil and soap, arrived on the 27th of March from Susa, from which she had sailed on the 20th with a foul bill, in consequence of the plague prevailing there; from 15 to 18 persons were dying daily. The day before sailing, one of the crew had been taken with symptoms of fever. On the 21st, vomiting with delirium set in, and next day he died. The master stated that there were no external marks of plague during life, but that several petechiæ were observed on the belly and thighs after death. Four of the remaining five persons of the crew were attacked with the plague, while in the lazaretto; one on the 3rd, and three on the 4th of April. Of these four cases, two proved fatal. *The health-guard, and two persons* (all from pratique) *who nursed the sick, were not attacked.*

1821.—A Maltese brig, laden with beans, arrived on the 21st of March from Alexandria, with a foul bill, having 14 of a crew and 8 passengers on board; two of the passengers and one of the crew had died during the voyage. On the 27th February, the day before sailing from Alexandria, ten passengers were received on board. Of these, eight were in good health; but two, a woman and her daughter, were sickly, having been suffering from diarrhœa. Both died, the mother on the 2nd March, and the daughter on the 16th; no marks of plague were observed, it was said, on examination of the bodies. Besides these cases, one of the crew, who had suffered much from sea-sickness and had taken no food, became feverish and delirious on the 17th; then profuse diarrhœa came on, and he died about midnight. Several petechiæ were observed upon the body. While in the lazaret, no fewer than ten of the crew and four of the passengers were taken ill; of these 14 cases, 12 proved fatal.

On the 28th of March, a health-guard and four sailors were embarked from pratique on board the infected vessel, to depurate it and land the cargo. One of the sailors was attacked on the 2nd of April and recovered; he had had the plague in Malta in 1813. Another sailor was attacked; he also recovered.

No mention is made of any of the official inmates of the lazaretto or attendants upon the sick having suffered.

1828.—On the 13th of June 1828, the Russian frigate "Castor," with 281 of a crew, arrived at Malta from Armiro, from which she had sailed on the 21st of May. She had previously left Malta in pratique on the 30th of April for Navarino and Modone. On the 3rd of May, she was in company with three other Russian ships-of-war; they had captured a Turkish corvette, which had sailed the day before from Modone for Alexandria, having on board 600 individuals, including the crew, invalids, sick, and wounded from Ibrahim Pacha's army. (It is not to be wondered at that some malignant fever prevailed amid such an assemblage). The captured corvette was manned by 15 sailors from the Castor, and men from the other Russian ships; at the same time, 200 out of the 600 of the corvette's company were taken on board the Castor, and, on the 11th of May, were all landed on the coast of Morea; the Castor receiving back the 15 of her crew from the corvette. On the 17th, she arrived at Armiro;

and on that day a sailor was seized with headache, vomiting, and delirium. Next day, another was taken ill with similar symptoms. On the 19th the former patient died, the body exhibiting externally nothing indicating plague. On the 20th, the latter was carried off; and still no marks of plague were visible on the body. On the same day, a third sailor was similarly attacked; he died on the 24th, but without having exhibited any of the outward signs of plague. On the 2nd of June, while at sea, a fourth sailor was taken ill; but, besides the general symptoms observed in the three preceding cases, this patient had a swelling under the right arm; he died on the 9th. As the surgeon now declared the disease to be a contagious pestilential fever, the frigate was immediately ordered to Malta, there to undergo quarantine and depuration. *No new cases occurred either on board or at the lazaret during the Castor's stay.*

1835.—A Russian brig, with a cargo of bales of cotton and linen and other susceptible goods, arrived from Alexandria on the 2nd May with a foul bill, bound for Leghorn, and having 13 persons (originally 15) on board. On the 11th of April, whilst at Alexandria, one of the sailors fell overboard; on the same day, he was taken ill with a pain in the chest. He, however, got better, and continued so until the day after leaving Alexandria (this was on the 18th), when he became worse, and on the following day he died: no marks of plague were observed on the body. On the 27th, whilst off Candia, another sailor was taken ill with pain in the chest, extreme debility and spitting of blood; he continued daily getting worse until the 28th, when he died. Several blue spots were observed on the body. On the 1st of May, being near Girgenti, a third sailor was seized with violent headache and general debility; these symptoms continued until the following day, when he died. On the same day (2nd), a fourth sickened in a similar manner to the others. The rest of the crew remained in health. During the stay in the lazaretto, five other cases occurred, and four of them proved fatal. In these four cases, there were petechiæ and carbuncles: in the fifth there were not any. *Again, there is no mention of any of the attendants in the lazaretto having been affected.*

1837.—An Ottoman vessel arrived on the 22nd February from Tripoli (which she had left on the 15th) with a foul bill of health, having a crew of 6 persons and 52 passengers on board. One of the latter had been taken ill on the day of leaving Tripoli, and continued so all the voyage: he had been kept apart in a small boat on deck. When taken to the lazaretto, two bubos were visible in the groins: the man recovered. *This is all that is stated respecting this vessel: the disease, therefore, did not spread to any one.*

1837.—An Ottoman vessel, "laden with susceptible goods and beans," which had sailed from Tripoli with 11 of a crew and 22 passengers on the 10th of February, arrived at Malta on the 23rd. One of the passengers fell overboard during the passage, and was drowned. Two of the passengers and one of the crew sickened in the lazaretto—one on the 27th, another on the 28th, and the third on the 8th of March; they all died on the second day after the attack. In one case there was a bubo, in another there were petechiæ.

Another vessel arrived about the same time from Tripoli with a foul bill, and two persons sick. On being conveyed to the lazaretto, symptoms of

plague appeared in both. One died. "*Two of the crew, who attended and nursed their fellow-sailor in free communication with him, continued in perfect health.*

1840.—H. M. steamer "Acheron" from Alexandria arrived at Malta 27th April 1840, with a foul bill of health in seven days, with eighteen passengers and forty-eight persons in crew, having brought the mails, several parcels, letters, and two horses, all well on board. On the 29th, early in morning, the health-guard, who was put on board on the day of her arrival, reported to the captain of the lazaretto that one of the crew, a boy, during the night, at about 9 P.M., died, and that one of the stewards was seriously ill. The corpse and the sick steward having been landed in the lazaretto and examined by the physician, evident symptoms of plague were observed upon them. "*The persons, who attended and nursed the deceased, continued well.*"

1841.—On the 9th of March, H.M. frigate "Castor" arrived in 15 days from Kaiffa, having had 13 cases (two were doubtful) of plague on board; of which 9 had proved fatal. Four of the men had been taken ill on shore at Kaiffa, before the frigate sailed. On the 23d of February, four other men were sent from shore to be put on the sick list. In one or two of the cases, the symptoms were those of gastric fever; but in others the fever was truly malignant, and was accompanied with glandular swellings in the groins and axillæ. In one case the cervical, and in the other the submaxillary, glands were affected; in the latter instance, the patient was to all appearance recovering from the original disease, but was carried off by the diseased state of the tongue and fauces, the viscid secretions therefrom having produced sudden suffocation. In one case, the symptoms resembled those of *delirium tremens*, and were treated as such.

It is unnecessary to enter into farther particulars; suffice it to say that there is not a vestige of proof that the disease was communicated, in a single instance, from the sick either to the healthy on board or to any one in the lazaretto.

1841.—An Ottoman brig, in ballast, arrived from Alexandria on the 26th of May, having 15 persons in crew, and 180 passengers (haggis). She had sailed from Alexandria on the 8th. One of the passengers had died during the voyage; and three others had sickened, when in sight of the island. While in the lazaretto, 13 cases of plague took place, and 10 of them proved fatal. Of these, one occurred in a Maltese boatman, who was put in quarantine, from pratique, with one of the patients on the 28th. No other particular is mentioned.

A month afterwards, an Austrian brig, in ballast, arrived from Alexandria, which she had left with a foul bill of health, and having a crew of nine persons, and 105 passengers: she was bound for Tangiers. Eight of the passengers died on the voyage. While in the lazaretto, other three cases took place. Two of these proved fatal; the third, which occurred in a health-guard who had put in quarantine with the sick, did well.

The last instance of imported plague in the lazaretto of Malta was that of an Ottoman brig, which arrived in July of the same year, in 37 days from Alexandria, with a foul bill of health, 87 persons on board, and laden with linen, flax, beans, &c. No casualty occurred during the voyage. While in quarantine, four deaths took place; one from dysentery, one from inflammation of the brain, one from enteritis, and one from (what is called) pestilential bubo.

Now these various facts, drawn from the experience of the quarantine authorities at Malta during the last 25 years, appear to us to afford convincing testimony as to the very little risk of the transmissibility of the plague, away from an epidemic focus of the disease. Here we have an account—unexceptionably authentic, be it remembered—of between 40 and 50 cases of recognised plague having occurred in the lazaretto of Malta, without the disease having been communicated in a single instance to any of the *employés* in that establishment. The only cases which occurred among those in pratique were four; and what, pray, were the circumstances in which these persons were attacked? Two were of a party which had been put on board an infected vessel, to clean her out; and the remaining two were men who, from pratique, were put in quarantine and confined along with the sick—most probably in a small room or chamber.

The critical reader will have remarked how promptly and easily the disease was arrested, and how small the number and mortality of cases were on board the two ships of war, compared with the merchant vessels, crowded as these latter often were with poor filthy passengers, who had come direct from a focus of infection. Most of these vessels moreover, it will be observed, had foul bills of health upon their arrival.

So much for the results of infected vessels which have arrived at Malta within the last 25 years. Let us now see what has occurred at Marseilles during the same period. Our information upon this point is derived from the French Report, which has been already analysed at so great length; but we have deemed it better to introduce the details here, for more convenient comparison with those just given.

1819.—A Swedish vessel arrived at Marseilles on the 1st of May from Susa, which she had left on the 15th of April, and from Tunis, which she left on the 20th: both places were at these dates afflicted with epidemic plague. She had a crew of 12 persons; and, besides them, 17 passengers had been received on board at Tunis. On the 25th, one of the sailors was attacked with plague; he died. On the 26th, another of the sailors fell sick; but he recovered after a very tedious convalescence. Besides these deaths on board, a woman and her infant died: the latter of dentition, the former of what was supposed to be milk-fever. The rest of the crew and passengers remained healthy.

On the 12th of May, one of the health-guards, who had been put on board the vessel, was taken ill: he died on the 16th.

Not a word is said of any other person, either in the vessel or in the lazaretto, suffering.

1825.—A vessel, laden with cotton, hides, and wool, arrived on the 30th June from Alexandria, which she had left on the 29th of May. On the 5th of June, one man was taken ill and died on the 9th with symptoms of plague. A boy fell sick on the 16th, and died on the 19th, on which day the captain also was attacked: he died on the sixth day afterwards. Another man was taken ill within a few hours of the arrival of the brig at Marseilles; he was without delay conveyed to the infirmary of the lazaretto. The constitutional symptoms were by no means severe;

two bubos had formed in the left groin, but neither of them suppurated. This man recovered. There was another case, in which the symptoms were comparatively very mild.

No mention is made of any of the attendants in the lazaretto being infected.

1837.—The "Leonidas," a post-office steamer, having on board 47 of crew and 18 passengers, arrived at Marseilles on the 9th of July, having left Constantinople on the 27th of June, Smyrna on the 30th, and Syra on the 1st of July. Passengers in quarantine had been embarked and disembarked both at Syra and at Leghorn; and at Malta, too, several passengers had been taken on board, but all in quarantine. Upon her arrival at Marseilles, one of the stokers was affected with low fever; he died next day. On examining the body on the 11th, it is stated that the brain and intestines were found to exhibit marks of violent inflammation; but that there was no appearance of bubos, carbuncles, or petechiæ. On the same day, another man, who was in the habit of sleeping in the same bed with the last patient, was visited by the lazaretto physician. He had been suffering for two days with severe headache, and within the last 24 hours, a painful swelling had made its appearance on the upper part of the left thigh. The case was regarded as very suspicious. The tumour became considerably larger, and the patient was in a state of great prostration with occasional delirium. On the 15th, petechiæ were observed on various parts of the body. On the 16th, a carbuncle appeared over the left ankle; the bubo had shrunk considerably; diarrhœa, vomiting, and delirium were the chief constitutional symptoms. The patient died next day. No *post-mortem* examination was made.

On the 20th, the cook of the "Leonidas" was taken suddenly ill in the lazaretto, with intense headache, vomiting, and great prostration. Besides these symptoms, there was a painful swelling at the lower part of the right groin. Next morning he was bled from the arm. On the 22nd, the headache was very severe, there was frequent vomiting of a greenish matter, the tongue was foul, and the patient was wandering in his ideas, and occasionally delirious. On the 23rd, the symptoms were more unfavourable; profuse diarrhœa had set in; the patient was in a state of collapse. Death took place on the 24th. When examined on the following day, the body was spotted with blueish patches in different places; the tumour in the groin had sunk down very much.

No mention is made of any of the lazaretto attendants having suffered; not even Dr. Chevillon, who had most heroically waited upon the two last patients with the greatest assiduity.

We need surely make no comments on the facts which have now been adduced;—facts too, be it remembered, drawn from the official records of lazarettos, the very places where we may be sure that the most would have been made of every event, which seemed to favour in any measure the doctrine of infection, and the consequent necessity of strict Quarantines.

And now what are the conclusions to be drawn from the mass of evidence that has been brought forward in the preceding pages? Are we going beyond the limits of fair deduction when we assert that henceforth the doctrine of the *contagiousness* of the Plague—by which term we mean its transmissibility from one person to another by mere contact—must be

utterly thrown overboard? And yet, be it remembered, it is upon this very delusion that almost the entire system of existing Quarantine Regulations has been founded. Had the disease been regarded as only one form of highly malignant fever, capable of infecting the atmosphere and thereby, under circumstances of neglected ventilation and cleanliness, of diffusing itself from the sick to those in their immediate neighbourhood, how much vexatious suffering might have been avoided! We cannot indeed recall the past; but let us act more wisely for the future. The now-admitted overwhelming evidence that the Plague has never, in one authenticated instance, been introduced by merchandize coming from infected countries must, in itself, be sufficient to open the eyes even of the most prejudiced to the enormous abuses of the present system.

But it is not to the pestilence of Egypt alone that the facts and reasonings, which have been engaging our attention, are applicable. If it has been proved that the diffusion of the Plague is always attributable rather to atmospheric influences than to any direct transmission from one individual to another, how much more may this be asserted of Epidemic Cholera and the Yellow Fever! That any reasonable person should ascribe the extension of the former of these diseases to the operation of personal infection, or seek to arrest its progress by military cordons and so forth, is indeed surprising. As a matter of course, we are not going to discuss the question at present. Suffice it to say, that Lord Ellenborough did nothing more than give expression to the general sentiments of the medical profession when he recently declared, in his place in the House of Lords, that Cholera in the East Indies is not an infectious disease.

With respect to the Yellow Fever, it may be fairly asserted that, although unquestionably apt occasionally to exhibit infectious qualities on board ships, and wherever the most perfect ventilation and cleanliness are not attended to, there would be no greater danger in admitting into a pure and airy hospital patients affected with it, than with the bad forms of common Typhus—which is done every day both in this country and in France.

In conclusion, we beg to express our earnest hope that, as the present Government has pledged itself to the working out of several much-needed social reforms, the general question of Quarantine may be one which shall meet with its prompt and scrutinizing investigation.

NOTES.

Note—page 22, *line* 2.

The very important question—*Can the plague arise spontaneously on board a ship that has had no communication with an infected place, or with any persons or goods that can be reasonably believed to be contaminated?*—has been started of late years, and is one that deserves much more attention than has hitherto been paid to it. As a matter of course, the ultra-contagionists will at once deny that such an occurrence is possible; but mere assertion will neither prove nor disprove the point proposed.

Several cases have been reported by Drs. Botzaris, Brayer, and Laidlaw which seem to prove that plague may arise under the circumstances alluded to.

One of the most remarkable instances on record of a *pestoid* fever, accompanied with all the characteristic symptoms of genuine Plague, being induced by the operation of local causes at a distance from an endemic locality, is that related in the 2nd Vol. of the Medico-Chirurgical Review, for January 1825.

Four sailors of a vessel in Whampoa roads went on shore to inter the corpse of one of their messmates, who had died of dysentery. Two of the men began digging a grave; unfortunately they lighted upon a spot, where a human body had been buried only three months before. The instant the spade went through the lid of the coffin, such a horrible effluvium issued forth that the two men fell down nearly lifeless. When taken on board, symptoms of fever speedily set in. On the fourth day from the commencement of the attack, numerous petechiæ appeared over the breast and arms; and, in one of the patients, a large bubo formed in the right groin, and another in the axilla of the same side, which speedily ran on to suppuration. Both men died; one on the evening of the 4th, and the other on the morning of the 5th day. On dissection, the inguinal and axillary glands were found enlarged and suppurating.

Note—page 24, *line* 36.

Lord Ponsonby, writing to Lord Palmerston in January 1839, says: "It is to be particularly observed that nobody pretends to be able to distinguish, with any tolerable certainty, the Plague from other fevers. I have known many instances of mistakes made by the most eminent of the medical men."

Dr. Robertson, in his official report of the British troops in Syria, uses these words:—

"Fever of a typhoid type and dysentery are very prevalent among the Turkish troops at Beyrout; this fever, in many instances, much resembles Plague, being attended with petechiæ and enlargement of the maxillary and parotid glands. I am very doubtful how far there exists a specific difference betwixt this form of fever and plague; it is difficult to distinguish between them in certain stages."

Dr. R., subsequently, again alludes to the fact that the typhoid fevers of Syria often much resemble Plague, being attended with petechiæ and enlargement of the parotid gland.

Note—page 38, *line* 3.

The description of Dr. Whyte's case is thus given by Mr. Rice, who was doing duty at the time in the plague hospital at El Hammed:

"Dr. Whyte came here last night, January 2nd, 1802; soon after he came in, he rubbed some matter from the bubo of a woman on the inside of his thighs. The next morning he inoculated himself in the wrists with matter taken from the running bubo of a sepoy."

In subsequent letters, Mr. Rice states that "Dr. Whyte continued in good health on the 5th, and all day on the 6th till the evening, when he was attacked

with rigors and other febrile symptoms." He continued to have shiverings, succeeded by heat and perspiration, much affection of the head, tremor of the limbs, a dry black tongue, great thirst, a full, hard, and irregular pulse, great debility and great anxiety. "He still persisted that the disease was not the plague, and would not allow his groin or armpits to be examined." He became delirious on the 8th, and died next afternoon.

Now, taking this narrative as a correct one,—and we have derived it from the article in the *Quarterly Review*, that was written by the late Dr. Gooch, in 1826, for the express purpose of proving that the Plague was a virulently *contagious* disease—is there not just ground for hesitation, before we positively assert that Dr. Whyte died of the Plague at all?; for the very characteristic features of the disease were certainly not present in his case.

Note—page 63, *line* 39.

Whether we adopt, or not, the opinion, far too dogmatically asserted by certain writers, that the Plague at Malta in 1813 was introduced by the vessel "St. Nicholas" from Alexandria, on board of which it unquestionably existed, there cannot, we think, be a reasonable doubt but that the disease subsequently spread by *infection*, *i. e.* by contamination of the atmosphere with morbific effluvia, and not by mere *contact* with the sick. Dr. Gooch, notwithstanding his ultra-contagionist prejudices, is obliged to admit that it cannot be *proved* that any communication ever took place between the St. Nicholas and the family on shore, in which the disease first broke out. Moreover, he omits to state that none of the fresh crew, that were put on board the vessel to navigate her back to Alexandria, were taken ill;—a very remarkable circumstance certainly, if she had imported the disease into Malta.

Dr. Hennen also (a decided contagionist) candidly acknowledges that, how the plague was introduced into Malta in 1813, is a question still involved in doubt—"nothing amounting to positive certainty being known." He mentions expressly that, for several months before the outbreak of the pestilence, a sickly state or "epidemic constitution" of the atmosphere existed in the island.

Note—page 41, *line* 34.

The alarm of some of the ultra-contagionist physicians in Egypt, during the prevalence of epidemic Plague, may be judged of from what we read of poor Dr. Lardoni, one of the physicians of the Pacha:

"His harness was wholly of unsusceptible materials, his saddle was closely covered with oil-cloth, his stirrups were braided and his reins made with filaments of the date tree; he had a huge oil-skin cloak in the shape of a sac, which rose above his head and descended beneath his feet; he was always escorted by four servants, one before, one behind, and one at each side, so that no person could approach him."

In spite of all these ridiculous precautions, the enemy found its way to him, He died of the plague; while many of his brethren, who took no precautions whatsoever, escaped, and are living to this day.

Had space permitted, we should have transcribed here the regulations in force in the present day, at Marseilles, for the treatment of cases of real or suspected plague. The patient is to be kept in a room by himself, separated by an iron barrier from the attendants. They are to be dressed in oil-silk, and have no direct communication with him; medicine and food being pushed on a tray as near to him as possible. If a bubo is to be opened, he is to be instructed how to do it himself! The medical men in their visits are always to keep 12 yards at least distant from him: unless, indeed, some student or assistant volunteer his services, and then he must be locked up in a room adjoining that of the patient.

Ought not the members of such a profession as ours to blush with very shame, at having had anything to do with the enactment of such cruel absurdities?

THE CHOLERA

NOT TO BE ARRESTED BY

QUARANTINE:

A BRIEF

HISTORICAL SKETCH OF THE GREAT EPIDEMIC OF 1817,

AND ITS

INVASIONS OF EUROPE IN 1831-2 & 1847:

WITH PRACTICAL

REMARKS ON THE TREATMENT,

PREVENTIVE AND CURATIVE, OF THE DISEASE.

By GAVIN MILROY, M.D.

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS, LONDON,
ETC.

"Internal sanitary arrangements, and not quarantine or sanitary lines, are *the* safeguards of nations."—*Registrar General's Report for the Quarter ending September 30, 1847.*

LONDON:

JOHN CHURCHILL, PRINCES STREET, SOHO.

1847.

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TO

RICHARD OWEN, Esq., F.R.S.,

HUNTERIAN PROFESSOR

TO THE ROYAL COLLEGE OF SURGEONS OF ENGLAND, ETC. ETC.

My Dear Sir,

It is with very great pleasure that I inscribe these pages to you. They contain views which I have long held, and which I communicated to the public first in my Essay on "Quarantine and the Plague," October 1846, and subsequently at greater length in an Article on the "Epidemic Cholera," which appeared in the Medico-Chirurgical Review for last April, when that Journal was under my co-editorial management. While the present sheets were passing through the press, the very valuable Report of the Metropolitan Sanitary Commission, of which you are so distinguished a member, was published, and it was with feelings of no ordinary satisfaction I found that the Commissioners had come to conclusions so much in accordance with my own. If the reasonings and illustrations,

adduced in the following remarks, have the effect of establishing the public mind in the soundness of these conclusions —the influence of which cannot fail to be powerfully felt on the general question of Quarantine and Sanitary Reform— one great object of my labour will be amply fulfilled.

Gladly availing myself of the present opportunity to express my sincere admiration of your high talents and the value I attach to our long-continued friendship,

I remain,

My Dear Sir,

Very truly your's,

GAVIN MILROY.

30, Fitzroy Square,
14*th December*, 1847.

EPIDEMIC CHOLERA,

&c. &c. &c.

The object of the following observations is two-fold—*first*, to determine, if possible, that most important point in the natural history of Epidemic Cholera, how and in what way is it, or rather its producing cause, conveyed from one region of the earth to another; and *secondly*, to point out some of the leading principles that should direct the physician in the treatment, preventive as well as curative, of this most malignant disease. The enquiry is therefore, full of interest to all, to the public generally as well as to the medical profession in particular; for, on the one hand, it has very obvious bearings, in various points of view, on the social welfare of the community; and, on the other, it involves the consideration of some of the most important questions that belong to therapeutic science. I may premise, that it forms no part of my present plan to give any technical or nosological description of the pestilence, which, from the extent of its range and the fearfulness of its devastations, has, during the last thirty years, attracted so much attention in almost every nation of the world; this has been most ably and accurately done by numerous writers well known to every professional reader. My main object is altogether of a more general character; viz., to take a rapid, but faithful, review of the more prominent circumstances connected with the rise, diffusion, and pestiferous character of the disease, comparing it with other epidemics of a somewhat analogous nature, and thence to seek to deduce what seem to be legitimate inferences respecting its ordinary mode of transmission from place to place, and the measures that are best calculated to abate its severity and diminish the consequent loss of human life.

It should be here remarked, that the terms *epidemic, pestilence, pestilential,* are used in the following observations as nearly synonymous; the only difference between them being, that the two last are employed to designate a malignant and fatal kind of the first. What is meant to be expressed by them all is simply this; the character or attribute of certain diseases to break forth at irregular intervals and generally without any appreciable cause, to spread over large districts or regions of the earth, lasting usually for a limited period of time, and then gradually and entirely disappearing. If it be kept in mind that a *blight* in the vegetable world, such as that which has of late years affected the potatoe-plant, is in very many respects the analogue of an epidemy or pestilence in the animal one, a perfect idea will be had of what is intended to be conveyed. In the sequel, I shall have more than one occasion to allude to this comparison.

That the general as well as special history of Epidemic Diseases—more especially in reference to the conditions in which they are apt to occur, the circumstances which seem to favour or obstruct their development and spread, the mutual affinities and relations which subsist between many of them, and the influence which hygienic and other means have upon their progress, duration and fatality—is a subject of deep importance to every physician, will be admitted by all; it demands his most serious attention, not only as a member of the medical profession, but as one of the social community among which he resides, and of the state of which he is a citizen. And yet, can we truly say that, for very many years past, it has met with that consideration which its great and manifold gravity requires, or that it has been investigated in that spirit of enlightened and comprehensive research, due to it as a theme on which the most conflicting opinions have been held? A calm examination of many of these opinions would speedily serve to show that but little progress has been made in sound knowledge upon some of the most essential points in the enquiry; and that not a few of our predecessors in the last, and even in the preceding, century entertained much more just ideas touching the leading features of epidemic diseases than have been generally prevalent during the present one, and even up to the year in which we live. The existing records of Quarantine medi-

cine too painfully proclaim the truth of this assertion. And why has this been so? The reason, I think, is obvious. Our modern medical writers have far too commonly limited their thoughts and attention to a few and detached particulars of a wide-spread malady, whether migratory or not, without taking into regard the great points of its entire history. Individual facts have been made to assume the importance of general principles and laws; and thus the physician has often been led into the very same blunder which a military officer would commit, if, by merely watching the movements and operations of a detached party of the enemy in one district of a country, he should thereupon undertake to determine the main causes which led to the issue of a whole campaign.

Most readers will remember how great was the agitation of the public mind prior to, and for some time after, the invasion of the Epidemic Cholera in 1831. This agitation was unquestionably not a little increased by the evident confusion and bewilderment that existed in the ranks of the medical profession. True, the disease was then new to this country and consequently to the mass of practitioners in it. So far, some allowance must be made for the many errors that were committed, and the extravagancies that were perpetrated, even by physicians of large experience and of high official standing. But now there could be no such apology or excuse offered, if plans and measures, which have hitherto been tried and found to be utterly useless, should again be sought to be re-instituted in this country, as they have already been in some countries on the Continent, and if the fears of certain alarmists were allowed to predominate over the well-pondered convictions of the most impartial enquirers. It is sometimes said that we know just about as much, and no more, of the epidemic cholera in the present day, as we did seventeen years ago when it was altogether strange among us. In one sense, indeed, this is perfectly true. The source or primary cause of the pestilence, the why and the wherefore of its appearance now and its subsidence and cessation then, of its lulls and outbreaks, of its journeyings in that direction and not in this, of its sparing some countries and devastating others,—on these and such like questions we are indeed as ignorant as we were then, nor is the next generation

likely to be more enlightened as to their true nature than the present. But in another sense the statement is altogether most inaccurate. In many respects, our knowledge of the disease is greatly in advance of what it then was. The knowledge may indeed be of a negative kind, but it is not the less real and practically useful. For, have we not been taught, beyond any possibility of mistake, the utter inefficacy of all, even the most stringent, means that can be employed by man to check its course or to avert its invasion?—and are not medical men now better able, than they were formerly, to appreciate the worth and value of the therapeutic proposals and suggestions which will doubtless be most prolificly brought forward, when the enemy again makes its appearance upon our shores?

Touching these two important particulars, the experience of the former visitation cannot but be of most admonitory instructiveness to every one, who has wisely learned to judge of things in Nature to come by those which have already taken place, and to profit by the lessons of others as well as by the results of his own observation. But, without pursuing this subject further at present,—for it will again come under consideration—I wish now to draw the reader's attention, without further delay, to a brief sketch or narrative of the history of the disease which it is the principal object of these pages to illustrate.

That the malignant form of Cholera was perfectly well known to, and has been very accurately described by, several medical writers of last century, must, I think, be conceded by every one who has read the descriptions which Curtis, Girdleston, Duffin and others have given of the disease which they witnessed in the East Indies, and to which the appellation of *mort de chien*, from the extreme virulence of its nature, had been applied by the French practitioners. There is not a single symptom exhibited in the cholera of the present day, that is not recorded to have belonged to the malady mentioned by these gentlemen. For example, what can be more graphically descriptive of the former than the following, necessarily very brief, extracts from the writings of the first two of these gentlemen? Curtis, speaking of the *mort de chien* at Trincomalee in 1782, and after having enumerated the successive symptoms of the disease, says:—"All

this while, the purging continued frequent, and exhibited nothing but a thin watery matter or mucus. In many, the stomach became at last so irritable that nothing could be got to rest upon it; but every thing that was drank was spouted out immediately, without straining or retching. The countenance and extremities became livid; the pulsations of the heart more quick, frequent, and feeble; the breathing began to become more laborious and panting; and, in fine, the whole powers of life fell under such a great and speedy collapse, as to be soon beyond the power of recovery."

And Girdleston has described with equal accuracy the disease, as observed by him in the naval hospital at Madras in the course of the same year. "The hands and feet," says he, "generally became sodden with cold sweat; the nails livid; the pulse more feeble and frequent; and the breath so condensed as to be both seen and felt issuing in a cold stream at a considerable distance. The thirst was insatiable; the tongue whitish, but never dry; vomitings became almost incessant; the spasms, cold sweats and thirst increased with the vomitings. * * * * Some died in the first hour of the attack; others lived a day or two with remissions."

It would be easy, if need were, to multiply like quotations from other writers of that day, to shew that the disease witnessed by them, in the course of the last century, was in no particular distinguishable from that to which so much attention has been paid during the last thirty years; and if this were not sufficient to prove their identity, I might appeal to the testimony of various medical men who were in India for several years before, as well as after, the outbreak of the pestilence in 1817, and who must have been fully competent to determine this question. The limits alone of this pamphlet prevent me from quoting their evidence at length. Not only had the disease been seen, previously to that time, in its *sporadic* or occasional form, and as an *endemic* of the country, but we have most authentic accounts of more than one dreadful *epidemic* or wide-spread invasion of it, in different parts of Hindostan. Thus we read that, in the Spring of 1781, a body of troops, on their way to join Sir Eyre Coote's army, was suddenly attacked near Ganjam. "It assailed them with incon-

ceivable fury. Men, previously in perfect health, dropt down by dozens, and those even less severely affected were generally dead or past recovery within less than an hour. The spasms of the extremities and trunk were dreadful; and distressing vomiting and purging were present in all." And, in proof of the migratory nature of that pestilence, we find that the disease "afterwards found its way to Calcutta; and, after chiefly affecting the native population, so as to occasion a great mortality during the period of a fortnight, it generally abated, and then pursued its course to the northward." Two years subsequently to this outbreak, it appears that the Cholera destroyed upwards of 20,000 people, assembled on occasion of a festival at Hurdwar; and Sonnerat, in his travels, alludes to an epidemic which, in one visitation, carried off above 60,000 persons from Cherigan to Pondicherry.

From such accounts as these, it is perfectly obvious that the pestilence of the present century is not, as has been asserted by a few writers, a new disease, unheard of and unknown before 1817. It is quite true that, in that year, the Cholera of India acquired a greater force of diffusive energy and a more abiding perpetuity of existence than it had previously exhibited; for, independently of its two great European migrations, it has unquestionably, since the period named, been far more frequent and more widely spread over Hindostan than it was before. As to the cause or causes, indeed, which produced this remarkable change, we need scarcely say that they are altogether inscrutable to us; nor can we wonder at this, when we consider our utter ignorance as to other great phenomena in the circle of Nature's works;—why, for example, the eruption of a volcano should occur in one year and not in another, or why a hurricane or inundation should desolate this region and spare the one that is adjoining to it. All that we can say respecting the origin of the fearful epidemic of 1817, is that its outbreak was preceded by a season of uncommon sickliness, produced, it was generally believed, by excessive rains and great vicissitudes of weather. There had been much suffering among the inhabitants, and a larger amount of mortality than usual in many parts of the Indian peninsula, during the latter part of 1816 and the commencement of 1817. It was in the Summer of this year that it suddenly broke forth

with great fury in various towns and localities in the delta of the Ganges. Some writers have attempted to fix the exact spot where it first appeared, and they have very confidently stated that this was at Jessore, situated on one of the central issuing branches of the mighty river. But the assertion in question has been most convincingly shewn, by more than one medical gentleman who was in India at the time, to be destitute of foundation; so that the only reason that can be alleged for its occasional repetition, in the present day, seems to be that it is supposed to give an air of probability to the doctrine of the disease having been spread by infection from one sickly spot, as from a centre of contamination, to the districts all round. The truth, however, is that the pestilence sprang up in numerous places, and some of these too at great distances from each other, about one and the same time. We have only to examine such a map as that which was drawn up by Mr. Orton within two or three years after its first appearance, and wherein the dates when it broke out at different towns and stations throughout the Indian peninsula are given, to be satisfied of the truth of this fact. Without particularising any of the numerous evidences that might be thence drawn, as utterly inconsistent with the idea of direct infection being the only or chief agency in the dissemination of the pestilence, it may be sufficient to allude to its occasional outbursts, and these too of great violence, at places very remote from the prevailing scene of its ravages, while the intermediate districts remained as yet intact. One of the most remarkable of these was the dreadful eruption of it that took place towards the latter end of 1817, in the camp of the Marquis of Hastings in Bundelcund, upwards of a thousand miles from the Gangetic delta. We shall afterwards have to direct the reader's attention to a very similar occurrence of more recent date, and one which equally proclaims how mysterious and unsearchable are, on many occasions, the movements of the enemy that we have to contend with.

In 1818, the disease, besides spreading over the entire extent of Hindostan from the Himalaya mountains to Cape Comorin, extended to the Burmese empire, Arracan and Malacca; and in 1819 it visited Penang, Sumatra, Singapore, Siam, Ceylon, and the Mauritius. In 1820, it reached Tonquin, Cambogia, Cochin

China, the southern parts of China, the Philippines, &c.; and, in the following year, besides visiting many of the islands in the Indian ocean, it made its appearance at Muscat in Arabia, and at Bagdad, besides other places in the Persian gulf. During the following two years, while still prevailing in many of the regions to the east of India, it spread through Persia, Syria, and Palestine, extending also, in a more northerly direction, towards Georgia and Circassia. In 1823, it appeared at Astrakan on the northern shores of the Caspian, and also at Orenburg, some hundred miles to the northward, on the confines of Russian Tartary. For the next five or six years, there seems to have been a lull in the diffusive power of the pestilence; its devastating march westward was thought to be arrested; and it was vainly believed that, as it was of Asiatic origin, it would be almost confined to the continent that gave it birth. There is every reason to believe that, in the interval between 1823 and 1829, it existed, with greater or less malignancy, not only in different towns in the north of Persia, but also in those vast unexplored regions that stretch between China on the east, and the shores of the Caspian on the west.* Be this as it may, it was in August of the last-mentioned year that it broke out a second time, and with great violence—no person could tell why or whence—at Orenburg; and about the same time, or a little later, it appeared at Tabreez, Tiflis, and other places on the Georgian frontiers of Persia and Russia. In July 1830, it again made its appearance at Astrakan with intense malignity, carrying off 4000 persons in that city, and upwards of 20,000 in the province, within the space of two or three weeks. Thence it extended along the course of the Volga, visiting the towns of Saratoff, Tamboff, &c. until it reached Moscow in September. Besides following this course, it had also travelled in a more westerly direction, towards the northern shores of the Black Sea, and thence along the lines of several of the rivers to the southern and central parts of European Russia. It was at Poland in the beginning of 1831, and proved very destructive at Warsaw and other places in that unhappy country in April and May. About the end of the latter month, it appeared at Riga and Dantzig; in June and July, at Petersburg and Cronstadt; at the same time extending through Gallicia and Hungary to Vienna and other parts in the Austrian dominions. While penetrating into the heart of Europe, it had not spared Egypt; a dreadful mortality took place at Cairo. Smyrna, also, and Constantinople were visited about the end of the summer. In August it was at Berlin, in September at Hamburg; and, at length, on the 26th of October, the first officially-declared case—for many of almost equal severity had been observed for months before—took place at Sunderland. Three or four weeks subsequently, it appeared at Newcastle; and, in December, at North Shields, Gateshead, Tynemouth and other adjacent places, as well as at Haddington in Scotland. It was not until the second week in February, 1832, that the first case occurred in London;—although, be it remembered, there had been an incessant and uninterrupted communication by land between the metropolis and the north. In the second week of March it was reported at Calais, and, a fortnight later, at Paris. In June, it appeared at Quebec and Montreal, and about the same time at New York. In July it spread to Philadelphia and several other cities of the United States, and thence over nearly the whole of the American continent. In the early part of 1833, it was at the Havannah and some others of the West India islands. From the New World it seems to have wheeled round upon its march; for it was not until the following year that Spain, and according to one account Sweden also, was visited by the pestilence. It is worthy of notice that there was a partial and slight return of the disease experienced in this country in the course of that year, 1834. In 1835 it re-appeared in the South of France, and, passing along the southern coast, attacked Genoa and some other towns on the shores of the Mediterranean; but it did not visit Rome or Sicily, at least with any degree of severity, until 1837, when it proved very destructive for several weeks in the Eternal City, carrying off, during the height of the epidemic, as many as 300 in the course of a day. In the course of that year also, the disease again manifested itself at Dantzig, Berlin, and other parts in the north of Germany; and subse-

* Dr. Merriman states that "it reached Siberia in 1827."—Vide Medico-Chirurgical Transactions for 1844.

quently, namely, in the month of October, occurred that singular, isolated, and transitory manifestation of it on board the Dreadnought hospital ship in the Thames, which has been so well described by Dr. Budd and Mr. Busk in the Medico-Chirurgical Transactions for 1838. After that time it ceased to be heard of in any part of Europe.

Such was the world-wide career of the great pestilence of the 19th century; a pestilence which, in point of the range of its diffusion and the destructive ravages which it produced, exceeded perhaps any of which there is a record, even the Black Death of the 14th century. Nothing seemed equal to oppose its progress. It scaled mountains many thousand feet in height; it crossed the Indian and Atlantic oceans; it traversed wide deserts of sandy plain. At one time it advanced, and that too often by a steady and easily traceable march, along a certain line or track; while, at another, it suddenly appeared many hundred miles off, without having affected the intermediate country. Although it usually followed the course of great rivers, it by no means confined itself to any one route or channel of communication. It steered its way in the face of the strongest winds, and of every other physical impediment; and, as we have already intimated, all human attempts to arrest or even delay its progress seemed utterly impotent. Its advances were certainly greatest in warm weather; but yet it prevailed in all seasons and latitudes, from the burning summer of Java to the freezing winter of Moscow. In some places and in some years, it came as a secret foe, breathed its poison, and ceased within a few days or weeks; while in others, and without any recognisable cause, it lingered for many months. Its victims were chiefly, as indeed is the case with all pestilential diseases, amongst the poor and intemperate; but the higher classes were far from being exempt from its power: still there was ample evidence to shew that the mortality was almost invariably commensurate with the filth and destitution of the inhabitants and the impurity of their abodes, and consequently that, in most countries, its fatality was frightfully increased by the neglect of the most obvious and simple sanitary measures. In a few instances it revisited, at intervals of from one to three or four years, certain places or limited points on the face of Europe;

and each return was generally milder than its predecessor.* Lastly, it may be noticed that the same individual has been known to have had two, and even three, attacks of the disease.

We have said that the mortality produced by the epidemic cholera probably very far surpassed that of any other pestilence of which there is an authentic account. In India alone it is supposed to have swept off, in the thirteen years from 1817 to 1830, upwards of fifteen millions of people. The island of Java in 1822 lost more than 100,000 of its inhabitants. In Pekin and other cities of China the mortality, there is reason to believe, was still more frightful. In Bussorah and Bagdad, a third of the inhabitants was carried off in little more than a month; and, in some parts of Syria, the ravages committed by the pestilence were even greater than this. Many of the countries of Europe, it is well known, suffered most severely. In Russia upwards of 60,000 perished, and in Paris alone the number of deaths was little short of 20,000, in the course of about six months. In our own country, including England, Scotland, and Ireland, upwards of 52,000, it has been calculated, perished of the cholera.

We shall afterwards have occasion to allude to the ratio of mortality, or proportion of deaths to the number of persons attacked: at present, we proceed to give a short account of the epidemic which is now committing its ravages in the east of Europe, and will most probably, ere long, make its appearance upon our own shores.

It is not easy to determine the exact date of its rise, or when it began to assume its migratory course westward. We know that the disease existed in a sporadic form and with considerable severity, in many parts of Persia in 1842 and 1843, and that it continued to be heard of there at intervals during the following two years. In the early part of 1845, it prevailed with great violence along the banks of the Indus, and about the same time, or a little later, it proved very destructive in Affghanistan. Thence it seems to have extended into Persia, traversing that country from east to

* The re-visitation at Berlin, in 1837, was an exception to this remark; for in that year it proved more fatal, although of shorter duration, than in 1831.

west, and spreading northwards into Tartary, and southwards into Kurdistan and into the pachalick of Bagdad. The St. Petersburg Gazette asserts that it was conveyed from Herat to Samarcand in September 1845, and into Bochara in the November following. Another account makes the pestilence to commence in, and emanate from, Mushed, in the north-east of Persia. Of course, but little reliance can be placed upon either statement. All that we can affirm with certainty is that, after having been quiescent during the winter of 1845-6, it broke out with extreme severity in the following May at Teheran, carrying off as many as 300 a day for several weeks, and reducing the population of that town by at least 20,000 souls. The description given of the cases shews the extreme malignancy of the epidemic:—"Those, who were attacked, dropped suddenly down in a state of lethargy, and, at the end of two or three hours, expired without any convulsions or vomiting, but from a complete stagnation of the blood, to which no remedies could restore its circulation." Now it is a fact full of interest to the medical enquirer that, at the very time when this work of devastation was going on in the north of Persia, there took place at Kurrachee, near the mouth of the Indus, that terrific outburst of the pestilence which, in the course of a few days, swept off upwards of 8000 victims. The description that has been given by an eye-witness of the scene is so full of fearful and instructive interest, as regards some of the most striking characters of pestilential visitations, that we cannot withhold a brief account of its leading particulars.

The heat had been intense during the first fortnight in June, but the station remained tolerably healthy. On the 14th, a Sunday, the atmosphere was more than usually stagnant and oppressive; one correspondent, who was present, says:—"the very heavens seemed drawn down upon our shoulders; the feeling was suffocating." A dark portentous-looking cloud crept up the sky as the troops were proceeding to church, and a sudden burst of wind threatened the buildings. It passed away almost as speedily as it came, and, when the worshippers retired, the air was as still as when they assembled. At the same hour did the pestilence appear. Before midnight, nine soldiers of the 86th regiment were dead; and men began to be brought into hospital

in such numbers that it was difficult to make arrangements for their reception. It was a fearful night. With morning, came the tidings that the pestilence was overspreading the town, and that fifty persons had already fallen victims to its deadly poison. How awful must have been the rapidity of the attack when we learn that sometimes, within little more than five minutes, hale and hearty men were seized, cramped, collapsed, and dead! The only thing we can compare it to is the deadly effect of a serpent's venom. Men, attending the burials of their comrades, were attacked, carried to the hospital, and buried themselves the next morning. Pits were dug in the churchyard, morning and evening; sown up in their beddings and coffinless, the dead were laid side by side, one service read over all! For the next five days, it raged with appalling fury; it then abated in its intensity, but continued to hover around the place for about another week. Within less than a fortnight, 900 Europeans, including 815 fighting men, were swept away. Besides these, 600 native soldiers, and 7000 of the camp followers and inhabitants of the town had been hurried into eternity! What must have been the scene of desolation and the sickening pollution of the air after such a visitation, when nearly 9000 bodies were festering under the ground beneath a tropical sun! It may be worthy of notice that, at the time when the cholera was raging in its full fury at Kurrachee, a very virulent kind of fever prevailed at Sukkur, about 180 miles or so off; it often proved fatal in the course of a few hours. Hyderabad, intermediate between the two places, was visited almost immediately afterwards by the cholera, but not severely; and it quickly disappeared.

Altogether, this comparatively insulated eruption at Kurrachee, while the head-quarters, so to speak, of the pestilence were in the north of Persia, presents an instance very analogous to that of the equally dreadful invasion of the disease in the camp of the Marquis of Hastings, in Nov. 1817, not long after the first appearance of the great epidemic in the delta of the Ganges. The same idea is naturally suggested by both; viz. that the cause of the malady was something altogether independent of infectious communication, and must have existed in the atmosphere.

But to return to our narrative. From Teheran it seems to have

spread in two different directions; one to the S. W., in the line of Ispahan, Shiraz, and Bagdad (which suffered most severely); and the other towards the N. W., in the line of Tauris or Tabreez. It was about the end of September that it reached this city, where upwards of 6000 perished in the course of a few weeks. The official account, from which these particulars are derived, expressly states that the pestilence was extremely irregular and capricious in its visitations; not always following the chief roads or principal lines of communication, but at times passing over wide districts without any traces of its presence, and breaking out at points far remote from where it had been chiefly prevailing. Not unfrequently however, the places, spared for a time, were subsequently visited, although no change had taken place in the intercommunications all the while.

At the time that Tabreez was suffering severely, the disease existed also at Reschd and other towns along the southern shores of the Caspian; while, in many of the towns further to the westward and northward, there was much prevailing sickness in the form of dysentery, diarrhœa, and other intestinal affections. The same thing had been observed at Teheran, and at most other places in Persia, for weeks and even months before the outbreak of the pestilence in them. The bearing of this fact upon the main argument of our discourse will be afterwards more fully pointed out. In the middle or towards the end of October, a few cases of cholera were observed at Salian and Lankeran, frontier Trans-caucasian towns of Russia where the disease had first shewn itself in 1830, and about the same time at Khoi, Makan, and Bajasid in Armenia. Erivan and Tiflis were as yet free. In the south, it had extended from Bussorah to Mousul and Diarbekir on the Tigris, thus threatening an invasion of Syria in that direction. In December it was at Mecca, where it seems to have raged with very great violence, being supposed to have been conveyed thither by the pilgrims from Bagdad. Early in the present year, it appeared to the west of the Caucasus, and committed great ravages in the Russian army acting against the Circassians. At first it was believed that the measures, that had been adopted by the Government of the Czar, had proved successful in preventing the introduction of the pestilence; but these

vain hopes soon proved to be fallacious. By the middle of May, it was at Tiflis and also at Astrakan at the mouth of the Volga; and where it reached its greatest intensity about the end of July. The towns of Kars and Kutais also, lying westward of Erivan and Tiflis, with many of the surrounding villages, were attacked about the same time. In August it broke out at Batoum on the eastern shore of the Black Sea, and soon afterwards at Erzeroum and Trebizonde, to the southward; reaching the last-named city about the 9th of September. Shortly before this time, it had appeared at Taganrog, Kertsch, Mariopol and other towns on the Sea of Azoff, and near the mouth of the Don; subsequently spreading in a northerly direction towards the more inland provinces of Charcow, Kiev, &c. Again, were all the most stringent preventive measures found to be utterly ineffectual in arresting, or even in slackening, the progress of the disease. By the Russian official reports in the middle of September, we learned that it was gradually spreading more and more into the heart of the empire, by two distinct lines; one more northerly and along the course of the Volga towards Saratoff, Tamboff, Kasan, Toula, and Moscow; and the other from the north shores of the Black Sea along the lines of the Don and Dnieper, and their numerous branches. The general direction of the epidemic has been north-westward; and it has been remarked that the route, followed in the present year, has been very nearly that along which the 'disease-producing something' travelled in 1831. On the last day of September, it appeared at Moscow, and about the same time at Odessa and at Perecop on the north-western shores of the Black Sea, having previously ceased, or nearly so, at Taganrog, Mariopol, and other parts to the eastward. In the middle of October, we were told by official returns that, without counting Georgia, the Caucasus, and the country of the Cossacks of the Black Sea, the disease existed with greater or less severity in sixteen different governments of the Russian empire. At the same time it was announced that it had again broken out in some parts of the north of Persia, as Tabreez, Khoi, &c., and also at Bagdad.

In the second week of November, the St. Petersburg Gazette stated that "the most western points the cholera has yet reached,

are the town of Alexandrof in the government of Kherson, and the district of Olgapol in Podolia," which is not above thirty miles from the Austrian frontier. To the northward, it had been travelling from Moscow to Novgorod in the direction of the capital, and also in a course nearly due west to Dwinaberg, at a very little distance from Riga, and within 40 miles of the Prussian territory. A letter from Vienna of the 20th ult. announced that some cases had occurred in the circle of Tarnapol in Gallicia. Besides the places already enumerated, there have been various reports of solitary cases having been observed at Cracow, Kiel in Homberg, Paris and even in this metropolis. I shall presently have occasion to refer to these precursory indications of a migratory disease on the wing.

The present epidemic, it may be remarked, has exhibited in different places not only a marked difference in point of malignity, but also a considerable diversity of character. Sometimes the virulence of the morbific poison was so intense as to prostrate the powers of life from the very first, and death has ensued in the course of a few hours. Such was the case, as we have seen, at Teheran at first. At other times and in other places in the East, the symptoms were much less alarming and fatal, consisting chiefly in vomiting and severe cramps. Occasionally the disease appeared under the somewhat unusual type of a bloody flux, so that the resident medical men hesitated to regard the cases as examples of the pestilence; but, as the other characteristic symptoms were present, and as the disease was prevailing in the place at the time, there can be no reasonable doubt as to the identity of the two affections. With respect to the actual mortality in different places, our information is far from being at all trustworthy: on the whole, it is certainly less than on the former visitation of the pestilence. I shall afterwards give a few data, when I come to mention the relative mortality, or average amount of deaths to the number of persons attacked: this will be most usefully done in my remarks on the results of medical treatment upon the disease.

So much then for the history of the two great migratory epidemics of Asiatic Cholera. Before proceeding to discuss the question as to the probable cause of their migrations, or, in other

words, the mode in which their diffusion has been effected, it will not, I think, be unprofitable to enquire if there has been any other epidemic disease which, in the length and breadth of its journeyings, has at all resembled the oriental pestilence of the present century; for surely it is not unreasonable to suppose that, if a well-marked analogy can be shewn to exist between the geographical course and distribution of two distinct and independent morbific agencies, there may be a considerable similarity as to the manner in which their diffusion has taken place. Now there is unquestionably no small degree of resemblance between the career of some invasions of the Influenza and those two of the Cholera described above; and as, besides this feature of resemblance, there seems to be a sort of consecutive affinity (if I may use an expression the meaning of which will immediately appear) between the two diseases, the following short narrative of the Influenza may not be unacceptable to the reader.

Although there is good reason to believe that Epidemic Catarrh (for that is the more ancient and much more correct appellation of the disease) must have been known before the 16th century, there is no accurate description of any wide-spread prevalence of it in Europe until we come to the year 1510. Subsequent visitations took place in 1557—1580—1658, described by our countryman, Willis—1675, described by Sydenham and Etmuller—1729-30—1733, described by Huxham—1762, of which we have an excellent account by Sir George Baker—1775, when the disease first received from the Italians the name of *Influenza*, from the atmospheric morbific influence supposed to give it birth—1782—1803—1831—also in 1833 and 1837, "the two most severe visitations," says a distinguished writer, Dr. Copland, "in this country upon record, and especially in London." There have been many more invasions of the disease than have been now enumerated; but these are certainly the most conspicuous, alike by the great extent of their range, and the accuracy with which their history has been recorded. To give the reader an idea how wide has been the diffusion of some of these visitations of Epidemic Catarrh, we shall take that of 1782. "It is reported to have broken out in September 1780, and to have become very general in the crew of the Atlas East Indiaman, whilst that ship

was sailing from Malacca to Canton. When the ship left Malacca, there was no epidemic disease in the place; when it arrived at Canton, it was found that, at the very time when they had the Influenza on board the Atlas in the China seas, it had raged at Canton with as much violence as it did in London in June 1782, and with the very same symptoms. In October and November 1781, it appeared in the East Indies, and was said to have attacked the British army while it was besieging Negapatam in November 1781. Its progress is stated by Webster to have been from Siberia and Tartary westward. At Moscow it prevailed in December 1781; at Petersburgh in February 1782; and it was traced to Tobolski. It was in Denmark in the latter end of April. From the shores of the Baltic it spread to Holland and the Low Countries, and thence to England. London was said to be attacked sooner than the west and north; Ireland a few weeks later, and the South of Europe later still; for it prevailed in France in the months of June and July, in Italy in July and August, and in Portugal and Spain in August and September; seldom continuing longer than six weeks in any place."*

Who that reads this account but must be at once reminded of the route pursued by the Cholera, that overspread Europe 17 years ago? Here, then, we have a remarkably analogous instance of an epidemic disease—which, be it remembered, is admitted by all medical writers without exception, most rarely, if ever, to exhibit infectious properties—originating in the East, and progressively spreading from region to region over the entire extent of the Asiatic and European continents. Nay, it was afterwards traced to have extended to the New World, almost every country of which, including the West India islands, seems to have felt the mildew breath of the disease. It has been said, by some zealous advocates of infection upon all occasions, that a very marked difference exists between Epidemic Catarrh and Epidemic Cholera; inasmuch as the former, they say, generally breaks out in different and often remote countries about the same period of time, whereas the latter advances from one place to another in a certain definite tract, which is almost always that of the chief

* Cyclopædia of Practical Medicine. Art. *Influenza*, by Dr. Hancock.

routes of intercourse. But the first of these positions is surely not in strict accordance with facts. No one will deny that, in certain seasons, the Influenza has been observed to appear over a very wide extent of region *at once*, just as we have shewn to be the case with some of the outbreaks of the Cholera;—a circumstance that is of course quite inconsistent with the idea of infectious transmission from person to person, and which can only be reasonably accounted for on the supposition of there being a diffused atmospheric malaria. But then it is equally true that, in other seasons, the course of the former disease has been far more gradual and progressive. Such was the case with the epidemic already described, and still more strikingly so with that of 1803, of which fortunately we have a very exact account, in consequence of the attention of numerous medical men, both in this country and on the Continent, being at that time specially directed to the very subject of its geographical diffusion. "This epidemic," says Dr. Hancock, "was observed at Paris and in other parts of France, and in Holland, some weeks before it appeared in London; and (according to the testimony of Dr. Bardsley) the same length of time was occupied in its progress from the metropolis to Manchester. Its course seemed to be from S. to N. It was in Cork and Dublin, before it reached the north of Ireland. * * * * * * It was observed to be epidemic in Sussex, and in some of the counties in the S. W. as early as February; in Shropshire, Nottinghamshire, &c. in March; in Yorkshire and Lancashire in April; and at Sunderland in May." The course of the severe epidemic of 1836-7 is equally instructive in this point of view. It appeared in Russia, Sweden, and Denmark in December 1836. The first cases in London occurred in the first week of January 1837. It appeared in Lancashire, Cheshire, Gloucestershire and the South-western counties from a week to a fortnight later than in the metropolis. In the beginning of February it was felt at Paris, and a few weeks subsequently in the north of Spain, and also at Lisbon. It reached Madrid about the end of March. In Malta, it shewed itself about the 1st of June. It is a remarkable circumstance that an epidemic influenza, having all the characters of the disease of the northern hemisphere, prevailed at Sydney and the Cape of Good Hope in

the latter part of 1836. Need a word be said, after these simple statements, as to the occasionally slow and gradual migratory course of the disease?

A page or two back, I gave as a reason for selecting Influenza as an analogue, in the mode of its wide-spread diffusion, to Epidemic Cholera, that there seems to be a sort of consecutive affinity or mutual connection between catarrhal and choleroid forms of disease. At all events, they have certainly, on very many occasions, been observed to prevail about the same period of time, or the one very soon after the other; as if the same constitution, or general condition, of the atmosphere were favourable to the development of both. Visitations of the Influenza have indeed been found to precede the invasion of other epidemic malignant diseases as well as that of Cholera; but of course I shall confine my remarks at present exclusively to the latter. Without going further back than the age of Huxham, we find that he alludes to the unusual prevalence of diarrhœa and severe vomitings and purgings in the summer and autumn of 1733, after the Influenza in the spring of that year. He has also described an epidemic dysentery, which prevailed both before and after the Influenza of 1743. The same was the case in 1762. In 1803, the Influenza was followed in this country by a low typhoid fever in some places, and in others by such severe gastric irritation, that Dr. Bertram, a most intelligent physician of Hull, was led to make the very curious observation that some of the attacks of the Influenza nearly resembled cholera morbus, expressing at the same time his "firm conviction of the two diseases being different types of the same disorder, and occasioned by the same cause." We need scarcely remind the reader that the Epidemic Cholera in 1831-2 was, in this as well as in several countries on the continent, preceded and followed by visitations of the Influenza; and the year 1837 was rendered remarkable not only by another very severe invasion of the same malady, but also by a partial return of the oriental pestilence in several parts of Europe. Both Dr. Hancock and Dr. Hecker* have made an emphatic allusion to the striking concomitance of the two diseases. The former, writing in 1832,

* The Epidemics of the Middle Ages. Translated from the German by Dr. Babington. London, 1844.

states that "it (the Influenza) has proved to be a true herald of the Epidemic Cholera in many places;" and the latter says—"The Influenza of 1831 was immediately followed by the Indian Cholera; and scarcely had this, after its revival in eastern and central Europe, vanished, when the Influenza of 1833 appeared." He then mentions the co-existence of the two in 1837. The experience of the present year will be found to afford confirmation of the same fact. Not to mention the unusual prevalence of low fever, diarrhœa and other gastro-intestinal affections, in very many countries on the continent as well as in our own land—a subject to which we shall presently advert more particularly—it is well known that, during the last and present months (November and December), there has been a great deal of Influenza in its varied forms, both among ourselves and in different districts abroad. For example, it was only the other day that it was stated in the public newspapers, that it was so general in Copenhagen and other parts of Denmark that scarcely a person had escaped. At the same time, several towns in the south of France were suffering severely from it. In Marseilles alone more than one-half the population was affected. In Paris, too, the *grippe* (as the French call the disease) has been unusually prevalent. I need not say how universal it has been over London, and in many other parts of Great Britain.

After this brief sketch of a disease whose history, in more respects than one, presents a striking analogy to that with which we are more immediately concerned, the reader will, I trust, be better enabled to follow me in the examination of the very important question—How is the epidemic cholera conveyed from one part or region of the world to another? And here I cannot but remark *in limine* that very much of the error and misconception, which have prevailed on this subject, has arisen from the contracted and unwise manner in which it has been looked at. It has been far too generally supposed that there can be only two views of the question under consideration, and that one alone of these can be right, the other being consequently wrong;—either that the disease is infectious,* and therefore that its diffusion is owing to its being

* I need scarcely say that Cholera is not *contagious*—using this word in its proper sense of "communicable by *contact*"—and that scarcely any one now holds the extravagant notion of its ever being transmitted by *fomites*.

transmitted from one person or body of persons to another; or that it is not infectious, and therefore that its spreading must be due to some other agency. Hence has arisen the division of medical men into infectionists and non-infectionists, as if there was necessarily a broad and well-marked line of demarcation between the opinions of the two parties. I am not speaking, be it remembered, of the advice founded upon these opinions, but simply of the opinions themselves, as a subject of philosophical enquiry. Now, is it not the case that a disease, although not primarily or essentially infectious, may acquire this quality under certain circumstances and in peculiar conditions? Is it not admitted by almost every medical man in the present day that Erysipelas and Dysentery, for example, are occasionally liable to become communicable in this manner?—and yet no one would dream of making infection a necessary attribute of either of these diseases.

In my remarks on the Influenza, I have said that it is scarcely, if at all, infectious. That it sometimes appears to be so, cannot be disputed; for it has been over and over again observed that, when a person labouring under this disease has entered a house as yet free from it, the inmates have become affected before the epidemic had fairly manifested itself among the neighbours. But then, as Dr. Copland* very justly observes, "it must be conceded that this infection was a very subordinate cause to that upon which the epidemic principally depended, and that it was merely a concurrent and contingent circumstance in the diffusion of the complaint." To the same effect, Dr. Hancock, another most able writer upon the subject, says:—"Upon the whole, it would appear that some general cause, if not originating, at least subsisting, in the atmosphere and depending upon its changes, progressive also in its movements from place to place and from country to country, gives rise to the disease; but that it is probable that *a limited propagation also takes place by personal intercourse*, under the influence and during the continuance of the epidemic constitution."†

We thus see, on the one hand, that a malady not originally and

* Dictionary of Practical Medicine. Art. *Influenza.*

† Cyclopædia of Practical Medicine, *loc. cit.*

necessarily infectious may become so under certain unsalutary circumstances; and, on the other hand, that infection may act an occasional and very subordinate part in the diffusion of an epidemic which is recognised by all writers, without exception, to depend upon a certain (unknown indeed) atmospheric malaria. Ought not these two great facts to be steadily borne in mind, when we undertake to discuss the question as to the mode in which the Asiatic Cholera has spread over the world? It is not enough to be able to adduce a few cases where the disease seemed to have been communicated from person to person, or conveyed from place to place. This may have been the case; I am not either willing or careful to contradict the statement; for it certainly is far from being improbable that human communication has, in a degree, although a very partial one, had something to do with the dispersion of the disease;—perhaps in a manner not altogether dissimilar from that in which the seeds of certain plants, although doubtless scattered over the wide surface of the earth, are universally found to follow the footsteps of man wherever he settles. The admission that man, the recipient and victim of the morbific miasm, may be made a subordinate agent in its dissemination, goes very little way to settle the main point at issue; for it is obvious that all the while the atmosphere may be the grand channel and medium by which it is diffused; and it would be quite as reasonable to build a general argument in a great medical question upon a few isolated and irregular examples, as for a pilot to judge of the wind by the mere vane on the vessel's side, without ever lifting his eye to watch the course and aspect of the clouds; or for one engaged in surveying a line of coast to mark the eddies along the shore, and neglect to trace the currents of the ocean stream. Yet, has not such been too often the case with many medical writers on the subject of our present enquiry? Having witnessed one, two, or more instances which, to them, seemed to be unequivocally infectious, they have forthwith sought to establish a general conclusion, and tried to make out that personal transmission has been the great, if not the only, agent in the dissemination of the disease. This idea once adopted, the most recalcitrant facts have been tortured into submission, while others, which could neither be gainsaid nor resisted, have been

either slurred over or altogether concealed; it being perfectly obvious to every one that, if the pestilence could spread itself in other ways besides, and independent of, personal communication, all preventive measures based upon this principle must be utterly nugatory.

I need scarcely say that it would be quite unprofitable to enter upon any discussion of the innumerable arguments *pro* and *con*, derivable from the consideration of individual cases or isolated sets of cases, that have been adduced on the opposite sides of the question. The very same facts have not unfrequently been brought forward in favour of opposite opinions. It can, therefore, be of no use to reproduce the multitudinous assertions, negations, re-assertions and re-negations, which have at different times been made, and whose effect has only been to bewilder and confound the reader, more especially if he be an unprofessional one. Such labour moreover is surely not necessary in the present day, as it will not be difficult to come near the truth in a much simpler and more conclusive way. And first, I would remark that even the most ardent advocates for the infectiousness of Cholera admit that the disease, prior to 1817, did not exhibit this character. Does not this circumstance alone suggest the unlikelihood of its subsequent diffusion being attributable to a cause or agency not previously in operation? It has, indeed, been just now admitted that a disease may, under certain circumstances, acquire infectious properties which it did not possess before; but then the nature of these circumstances is universally such as to create that vitiated state of atmosphere which, it is well known, is always liable to engender Typhus fever; viz. whenever a multitude of human beings are congregated together in a confined ill-ventilated space, and especially when poverty, filth, and mental wretchedness are present at the same time. Very different from all this has been the history of the rise and progress of the Gangetic pestilence, since it burst forth in 1817. How or whence it arose we cannot tell. Of its immediate or exciting causes we know just about as little as we do respecting the origin of that blight which, during the last two years, has told so heavily upon our nation's welfare. Nor can I pass over this allusion without a word of comment; for, there is anything (as indeed has been already remarked in a

previous page) but a forced analogy between the epidemics of the two kingdoms of animated nature; and, if I am not much mistaken, there would be nearly as much wisdom in seeking to keep out the one as the other, by any artificial means of attempted prevention. Few themes would be more interesting, perhaps instructive also, than an exact and accurate history of the geographical distribution of wide-spread blights and mildews in the vegetable world. But this is a subject of which I am wholly ignorant. I may merely mention that, for several years prior to the outbreak of the potatoe-disease among us two years ago, it had been observed, in a partial degree, in different quarters of the globe; as in several parts of Germany, in the United States, and even in the Southern Hemisphere, at the Cape of Good Hope, and elsewhere. Now, when we see such indubitable evidence of the migratory course of the pestiferous *something* (let us call it with the forefathers of our profession τι θειον, *quid divinum*, as a reverential expression of our ignorance), which produces a wide-spread and desolating epidemic in the vegetable kingdom, why should we hesitate in admitting the existence of a similar, I do not say an identical, cause in the case of epidemic diseases in the animal one? The cases are very strictly analogous in many points of view, which want of space alone prevents me from setting forth at large.

But there is one topic, mixed up though it necessarily be with a good deal of hypothetical speculation, to which a passing allusion may not unprofitably be made. It is well known that many sorts of blight among plants are unquestionably owing to the existence of swarms of the minutest insect tribes, which at particular times and in certain localities become developed, and spread over a large portion of the globe, sometimes irregularly and diffused, at other times along certain tracts which can be distinctly defined. Now, why may not some epidemic diseases, it has been very reasonably argued, in the animal kingdom be owing to a similar agency? There is certainly much to warrant the idea; and, at all events, it explains, better than any other hypothesis, many of the phenomena of the moving course of such maladies as the Cholera and the Influenza.*

* Most professional readers are doubtless acquainted with the beautiful

But, without pursuing this very interesting subject, incapable as it is of direct proof, I have now to solicit the reader's attention to one or two recognised and well-established phenomena in the history of the former of these diseases, as they seem to me to afford almost infallible evidence that its producing cause is present in the atmosphere, and is susceptible of aerial transmission, quite independently of all human communication. It has been mentioned, in our short narrative of the present epidemic, that the countries in advance of its course, or, in other words, westward and somewhat northward of the line which it has followed, have almost invariably suffered with a mild and mitigated form of the disease for one, two, or three weeks, or even longer, before its appearance in its full malignity. That such is the fact is placed beyond all doubt; and it is not likely to be disputed by any one, whatever opinion he may hold as to its cause. It will be remembered that this was a topic in the history of the epidemic of 1831-2, which attracted much attention both in this country and elsewhere; nor can it be too attentively considered, seeing that it has very important bearings in a practical as well as in a speculative point of view. It was particularly dwelt upon by Dr. Brown, Dr. Ogden, and other medical men in Sunderland and elsewhere. For two or three months, at least, before the occurrence of the first officially-declared case of the pestilence in that town, there had been a marked prevalence of unusually severe stomach and bowel complaints. Thus Dr. Brown tells us that "ordinary cholera was most unusually prevalent; whilst cases of disease, certainly not distinguishable by symptoms from the epidemic, occurred on the 5th, 8th, 14th, and 27th of August (two months, it will be observed before the declared importation of the foreign disease); and cholera continued to be very prevalent and severe throughout September. The cases which occurred in August were not matter of secrecy, but even the subject of conversation among the medical men of the place; and the writer frequently made the remark, that we were partakers of an inferior degree of the epidemic influence which existed on the Continent. But certainly, at the time, he did not

essay of Dr. Holland upon this subject, in his "Medical Notes and Reflections."—London, 1840.

(nor does he yet) ascribe them to imported contagion; nor did he then conceive that we had, properly speaking, the epidemic among us."*

Now the very same thing occurred in many other parts of the country; insomuch that it was often impossible to determine the exact date on which the precursory *choleroid* or *cholerine* (as they were sometimes called) cases ceased, and the real disease displayed itself. In Paris too, and again in Canada and the United States, a similar sequence of phenomena was observed; nor was it less remarkable in the case of the pestilential invasion of the Mauritius in 1819, about which so many erroneous statements have been made, and which, when impartially investigated, will be found to afford a very strong argument against the importation of the disease by infection.†

What was observed of the epidemic of 1831-2 is equally characteristic of that which is now threatening our shores. Allusion has been made in a preceding page to the sickly state, from the prevalence of bowel complaints, &c., of the towns on the Caucasian frontier, ere the pestilence had reached them, and while it was raging at Tabreez, Reschd, and other towns in the north-western parts of Persia; and in what other light are we to regard those not unfrequent announcements of late, in the public newspapers, of supposed cases of the disease having manifested themselves at Riga, in Malta, at Vienna, Kiel, and even in Paris, and among ourselves, save and except as indicating the advancing approach of the coming storm? I have already remarked that, in almost every country of Europe, there has been, for some months past, a more than ordinary prevalence of diarrhœa and other affections of the bowels, associated very frequently with symptoms of a typhoid character. All this too surely announces an unhealthy state or diathesis of the atmosphere. Nor can I see how the force of the argument now adduced—I mean the occurrence of a mild and modified form of the malady before the

* Cyclopædia of Practical Medicine, vol i., p. 399.

† The reader will find an authentic statement of the circumstances attending this visitation of the Isle of France in the Medico-Chirurgical Review for April 1847.

pestilence fairly declares itself—can be evaded by those who regard personal infection as the principal agent in the dissemination of the Cholera, and who consequently recommend prohibitory measures in the hope of arresting its progress. And here it may be mentioned, as an additional feature of resemblance in the two epidemic diseases between which I have sought to draw a parallel, that, in visitations of the Influenza, it is by no means unfrequent to meet with scattered cases for days and even weeks before its full and decided invasion; and it is also a curious fact that it has, on several occasions, been observed to exist among many of the domestic animals for a considerable time previous to its outbreak among the human species.

There is another circumstance, already illustrated in the course of these observations by more than one striking example, which is utterly incompatible with the idea of infection playing the chief part in the diffusion of the Cholera; and that is the sudden seizure of hundreds of persons in a place on one and the same day. How can any one seek to reconcile such an occurrence with the notion of the disease being communicated from one person to another, and of its proceeding, as it were, step by step, until it has overspread a space of several miles in circumference within 24 or 36 hours? Yet this most improbable opinion has actually been held and stoutly maintained; but only by those who, having once adopted a favourite doctrine, are determined to subject all facts, however rebellious, to its Procrustean requirements. In connexion, too, with the present argument, and as affording irrefragable evidence of there being a malarious condition of the atmosphere during the existence of Epidemic Cholera in a place, it may be also mentioned that almost all the inhabitants of a town or district often experience its morbific effects in some degree or another; just as we know to be so generally the case during the presence of Influenza: very few persons escape it altogether. In the one instance there is a marked tendency to irritability of stomach and to relaxation of the bowels, or to crampy twitchings in different parts of the body, these symptoms being especially apt to supervene upon any impropriety of diet; while in the other, slight catarrh, headache, and unusual lassitude and general debility, are pretty sure signs of the person having

come within the influence of the miasmatic agency, whose power is always aggravated not a little by exposure to whatever is liable to produce common catarrh. Other diseases too, which may happen to prevail in a place at the same time, very generally exhibit something of the character or impress of the predominant epidemic. This character has been much dwelt upon by Sydenham and others of the old school; and the truthfulness of their observations has been abundantly confirmed in the history both of the Cholera and of the Influenza.

When, in addition to the general considerations now submitted to the attention of the reader, it is remembered that nine-tenths, I might rather say 99 out of every 100, of the medical men in India entirely reject the idea of the disease being propagated by infection,—that it has over and over again broken out in places remote from, and having no direct communication with, those where it chiefly prevailed,—that the attendants upon the sick are not a whit more liable to be attacked than others, a fact quite as true in Europe and America as in the East Indies,—that the pestilence every now and then unexpectedly bursts out in some district previously healthy with amazing fury, sweeps off its thousands, and then, in the course of a week or so, ceases altogether, sometimes after a thunder-storm, at other times without any appreciable cause,—that in its migratory course it has frequently appeared in numerous points of a large and scattered city at the very same time, while, in other instances, the distance of a few hundred yards has made all the difference between a region of almost inevitable death and one of complete exemption and even of health, notwithstanding that uninterrupted communication existed all the while between the two;—and when, too, we call to mind the indisputable fact that, upon no one solitary occasion, have quarantine and other preventive measures of a like nature, however stringently and perseveringly employed, ever yet succeeded in keeping out the disease from any country;—that the Russian Government, in 1831, having found their utter inefficacy, speedily abandoned all attempts of the sort,—that the Austrian Emperor formally declared that, "he had committed an error in adopting the vexatious and worse than useless quarantine and cordon regulations against cholera," frankly ad-

mitting that he did so before the nature of the disease was properly understood,*—that Prussia, too, having in vain had recourse to the same expedients, was forced to give them up,—that, in our own country, the Government intimated, in the Speech delivered from the Throne, if not their positive disbelief, at least their emphatic incredulity as to the importation of the disease from the continent by shipping or otherwise;—that one of the latest acts of the Central Board of Health in London was to announce that cholera patients should be as freely admitted into our public hospitals as any other sick,—that the Board of Health in Ireland candidly admitted that "they were not able to trace the disease to any communication by which it might have been introduced into the neighbourhood of Dublin,"—that the leading physicians and surgeons in Paris drew up a formal memorial, declaring their disbelief in its infectiousness, and that the French Academy of Medicine adopted and confirmed this opinion,—that the Government of the United States, too, at first tried the effects of quarantine protection, but quickly abandoned it, the chief medical men in New York, Philadelphia, and other leading cities of the Union having pronounced against it;—when, besides these numerous and forcible reasons, we think of the singular exemption of some countries in Europe from the disease for one, two, and even four years after the general visitation in 1831-2, and even after the pestilence had crossed the Atlantic and made its power to be felt over nearly the entire extent of the New World; and all this, too, certainly not from any unusual stringency in the quarantine laws of those countries, but from some hidden cause quite beyond our ken,—can any one, after impartially thinking upon all these things, reasonably entertain a doubt as to the utter inadequacy of personal infection to account for the career of Cholera, or hold to the folly and wickedness of ever again attempting to arrest its march by measures which have been proved to be wholly valueless? As well might we ascribe the blasting of our crops to direct transmission of the morbific cause from plant to plant—although unquestionably some forms of blight are capable of being propagated by immediate contact of the healthy with the diseased—and seek to protect them from the unseen foe by building a lofty wall around the threatened fields, as hope to keep out a disease like the epidemic Cholera or Influenza by sanitary cordons or quarantine restrictions. Truly has it been remarked by one of the most philosophic medical writers of the present age, when alluding to the Plague of Athens, that "we know by recent experience that these great scourges cannot be turned aside by any human appliances, and that the fires then lighted in that city could not have had more power against the epidemic which, brought from a distance, desolated its inhabitants, than what contemporaneous medicine has been able to employ against the pestilence from the banks of the Ganges. Whenever the power of arresting such ravages has been attributed to medical art, the statement is necessarily fallacious."* It would be easy to confirm the perfect truth of this remark by the concurrent testimony of a host of authorities. But I have no wish to rest my case upon so fallible a foundation as this, well knowing that my opponents are not without names of considerable repute upon their side. With the exception, therefore, of a very brief allusion to the published evidence of two of the ablest writers of this adverse party, I may confidently leave to each reader to draw for himself what certainly seems to me to be the only legitimate conclusion from the facts and reasonings, which have been submitted to his consideration. Dr. Copland, after a most elaborate attempt to espouse the doctrine of the ultra-infectionists, feels himself compelled, by the strong force of past experience, to acknowledge that, "where a strict quarantine, or sanitary measures calculated to confine the pestilence to the place of its introduction, cannot be maintained, the mischief resulting from the attempt will be greater than the benefits which will arise to the community;"† and Mr. Orton, who belongs to the same side of the question, yet very candidly admits that "there is reason to believe that the virus which propagates this disease is of a very subtle or volatile

* *Vide* a series of admirable "Letters on the Cholera Morbus," by Dr. Gilkrest, Inspector General of Army Hospitals, &c., London 1831. Dr. G. was unquestionably the first in this country to proclaim the utter inutility of Quarantine to arrest the disease.

* Œuvres Completes d'Hippocrate. Par E. Littré. Vol. I., p. 42.

† Dictionary of Practical Medicine. Vol. III., p. 241.

nature, and is readily conveyed by the atmosphere; whence it arises that there is little, if any, increase of danger from the most intimate communication with the sick during the prevalence of the disease, above that which attends the common intercourse of society."* Several other passages from this gentleman's work might be quoted to shew that, although an avowed infectionist, he considers that no quarantine, however stringent, will ever serve to keep out the pestilence. Truly, with such an opponent we are willing to overlook a few minor differences of opinion, and may surely claim to enlist him among the number of our most useful friends.

Much stress has been laid by the ultra-infectionists upon the two circumstances, that the Cholera has often—certainly not always, as has been pretended—followed the chief routes or lines of human intercourse between points at a distance from each other, and that it has, on several occasions, first manifested itself in a place among persons recently arrived from an infected locality. I have already alluded to the first of these objections, and need not now recur to it; for unquestionably far too much importance has been attached to a circumstance which, even if it was universally true, proves but little in determining the main question. And, with respect to the second, I may merely remind the reader that the very same thing has been observed, over and over again, in the case of the Influenza, as well as of other epidemic disorders; and moreover that, in almost every instance which has been quoted in reference to the Cholera, the disease was, so to speak, at the very door,—nay, on some occasions, had already entered—where the unlucky individuals first attacked are supposed to have introduced the morbific poison. Such was memorably the case with the alleged importation of the malady into the Mauritius in 1819; and the history of the European visitation of 1831-2 so teems with proofs to the same effect that, even if space permitted, it would be almost useless to occupy the time of the reader with particular details. Indeed, my only reason for alluding to the matter now, is to direct his attention for a moment to the striking contrast which the migration or

* An Essay on the Epidemic Cholera. 2nd Edition. London, 1831, p. 313.

mode of diffusion of a disease truly infectious presents to that of the pestilence now under consideration. Take, for example, Typhus fever, of whose wide-spread prevalence there have been such melancholy proofs in this country, and in our American colonies, during the course of the present year. No one can for an instant doubt but that the dissemination of this too-certain offspring of famine and wretchedness has been mainly owing to the vast numbers of Irish poor who have scattered themselves in all directions, carrying the seeds of their self-engendered disease wherever they went. So surely has this been the case, that the track of their dispersion over the length and breadth of the land might be as readily followed by the outbreak of the fever, as the path of the early sower by the line of springing corn along the furrowed field in summer. Wherever a poor Irish family located itself, there inevitably did the disease—provided always there existed in the place a similar condition of insalubrity to that amid which it first arose—make its appearance; nor can it be necessary to do more than merely allude to the still more melancholy and disastrous results that occurred on board the ships, in which the infected emigrants were carried to the shores of the New World. That, in these instances, the fever was transmitted from person to person, and conveyed from country to country, it requires no argument of mine to prove. Not, indeed, but that it is endemic and indigenous—although in a much less degree—in this country as well as in Ireland; for it is well known that it will as certainly spring up in some form or another wherever human beings are congregated together in wretchedness, want, and impurity, as noxious weeds will appear in a neglected soil. But that the leavening virus was, in the majority of instances, directly introduced in the manner I have mentioned, has, alas! been too obvious to admit of any doubt. The malignancy and extent of the disease have been uniformly proportionate to the number and sickliness of the emigrants that were received, coupled with the insalubrity of the place where they took up their abode; and need I add, in confirmation of the same fact, that it only required the disinfecting powers of cleanliness, of a sufficient supply of wholesome food, and free ventilation to be brought into requisition to put a stop to an evil, which

by no other means whatever can be subdued. But will any medical man say as much respecting the Epidemic Cholera, or venture to promise as sure success, either in preventing its invasion or in arresting its progress, by the adoption of like means? I trow not. And why?—because the one is the recognised and indeed infallible offspring of causes over which we may have direct controul, the other is the mysterious product of agencies beyond our ken; the laws which regulate the diffusion and fatality of the one are known, those which preside over the spread and malignancy of the other are almost altogether inscrutable; the course or career of the one may be predicted with nearly unerring certainty, while that of the other is hid in utter darkness; the one reminds us (to recur to a similitude already used) of the tares and weeds in the sluggard's garden, the other is like the blight that falls even upon the most cultivated fields; and, lastly, may we not say that the one seems to admonish man of the fearfully retributive penalty which awaits the wilful neglect of his poorer brother's welfare, while the other unmistakably proclaims to him his own powerlessness before any of those great judgments with which it may please the Almighty Ruler to visit the earth, and thus teaches him his dependence upon One that is higher than himself.

I trust that, by this time, the reader will have seen sufficient grounds to adopt with me the opinion that the producing cause of Epidemic Cholera is a virulent "something" present in the atmosphere, capable of being conveyed hither and thither, bursting forth in one place and travelling on to another, often quite independently of all human communication. If such be the case—and how the prominent circumstances of its history can be explained otherwise, I cannot understand—the inevitable inference will be that all attempts, by prohibitory and restrictive measures, to shut out the disease or arrest its progress must, at best, be vain and useless. Admirably does Mr. Farr, in the last quarterly report of the Registrar-general, give expression to this sentiment, associating with it, too, another of equal truth and importance, when he says:—"Internal sanitary arrangements, and not quarantine and sanitary lines, are the safeguards of nations" against the invasion of epidemic diseases:—an apothegm

which I have adopted as a motto to this pamphlet, and one that should be graven on the mind of every one who has a voice or interest in legislation upon the subject. Thanks to the progress of enlightened opinion, it is not requisite now-a-days, in this country, to try to convince people of the absolute necessity of adopting some means to insure greater cleanliness and a purer ventilation in the lanes and alleys of our large towns. The truth is admitted by all, although most unfortunately—ought we not rather to say, most discreditably?—it has hitherto been so imperfectly and inefficiently acted upon. As it was in the days of our forefathers, so it is with us; for, alas! very little progress has yet been made, even in this loud-boasting nineteenth century, in rectifying the horrible abuses that have so long existed among us, more especially in reference to the state of our streets, the dwellings of the poor, &c. Old "doctour Caius," nearly 300 years ago, when admonishing his countrymen as to the best means of prevention and cure in a remarkable pestilence of that age—a pestilence, by-the-bye, which has been thought by certain writers to have been akin in some respects to the Epidemic Cholera—does not forget to remind them, in addition to personal "clenelines, a great helpe to helthe," to "take awaye the causes of enfectiõ, by dymnyng diches, auoidynge cariõs, lettyng in open aire, shunning euil mistes, not openynge or sturrynge euill brethynge places, landynge muddy and rottē grounds, burieng dede bodyes, kepyng canelles cleane, sinkes and easyng places sweat, remouyinge dongehilles, boxe and euil sauouryng thynges, enhabitynge high and open places."* No better instructions could be given in the present day to our local boards of health, adding only a plentiful supply of fresh water, and a well-acting drain to every house. Truly, if such a system of purification were generally followed out in all our towns with persevering assiduity, there need be little cause, comparatively, for public alarm at the threatened invasion of the Cholera or any other pestilential disorder; and then would be seen, and felt too, the truthful force of another of Mr. Farr's observations, that "a salubrious city in

* A Boke or Counseill against the Disease commonly called The Sweate or Sweatyng Sicknesse, made by Jhon Caius, Doctour in Physicke. London, 1552.

an epidemic, like a city built of stone in a conflagration, is exposed to danger and injury; but not to the same extent as the present cities of Europe, which are left without any adequate regulations for the health and security of their inhabitants." The whole history of the pestilence, which we have been considering, affords an emphatic illustration of the justness of this remark; for, as surely has Cholera always sought out and settled down upon the abodes of misery and filth in every city of Europe that has been visited by it, as the vulture-crows in the East ever congregate where the most offal and garbage are to be found. I need scarcely add that the mortality among the lower classes has invariably been a hundred, nay a thousand, fold greater, than among persons living in cleanliness and comfort.

Great then must be the responsibility upon those, who are comparatively so exempt from the ravages of the disease, to employ every means within their power to ameliorate the condition of their less fortunate brethren; and no less obligatory is it upon every well-regulated state to interpose in behalf of that class of its subjects who, whether from their own inconsiderate negligence or from the grinding oppression of hard-hearted cupidity, are so often left the victims of poverty, crime, and disease. I may remark, *en passant*, that there is a tendency at the present time, even amongst men who should know better, to attach an exaggerated importance to the use of what have been very improperly called "disinfectant" agents—such as the solutions of chloride of lime, chloride of zinc, nitrate of lead, &c.—in guarding against the development and spread of pestilential diseases. These substances have, indeed, the power of correcting offensive smells, and of arresting, more or less completely, the process of putrefaction; and, as the words "infect," "infection," have often been used even by medical writers in a vague and inconstant sense, they are very frequently associated, in common parlance, with the idea of the presence of foul and putrid effluvia. An attempt was made, a few months ago, to make the public believe that, by means of one of these so-called "disinfectant" agents (the Ledoyen fluid), not only might the foulest odours be got rid of, and the deleterious gases emitted from putrescent animal matters effectually neutralized—two very important points certainly upon many

occasions—but even the development and spread of malignant fevers and other communicable diseases might be prevented. Now, this is a great and dangerous mis-statement, and one therefore against which the unprofessional reader, more especially, requires to be put upon his guard. There is no necessary connexion between the existence of the most offensive stench and the presence of febrific miasmata; and the one nuisance may be most satisfactorily extinguished, while the other remains little, if at all, abated. Indeed, the very possession of an efficient stench-destroying agent *may* not unfrequently lead, in certain circumstances, to the very serious evil of getting rid of a temporary nuisance, while the removal of the radical mischief is wilfully overlooked or neglected. The only genuine "disinfectant" is, after this main point has been attended to, an abundant supply of fresh water and of pure air. In a sanitary point of view, as respects the diffusion of pestilential diseases, frequent ablution and free ventilation are worth all the chemical preparations in the world.

A proposal has at times been made to employ *fumigations* of Chlorine, and other active gases, with the view of destroying the aerial miasm on which a disease like Epidemic Cholera is supposed to depend; and some fond writers have even gone so far as to promise the arrest, nay even the extinguishment, of the pestilence in this way. This suggestion would scarcely deserve a comment, were it not that, unfortunately, great publicity was given to a recommendation of it, by a chemist of eminence, a month or two ago.* Could we, indeed, localize and confine the atmospheric poison to a spot, and subject it to the action of an acrid fumigation, it is not at all improbable that we might succeed in the philanthropic attempt to destroy it; but, until this problem be solved, it would be in vain, I fear, to trust to the fanciful experiment. The only use that such means as acrimonious chemical vapours are likely to have, is to necessitate a free perflation of fresh air wherever they are employed; and then perhaps the ancient expedient of burning green wood, and similar materials, might answer nearly as well.

The consideration of the above matters leads us, by a natural

* The "Times" newspaper for October 12th.

transition, to the subject of the Treatment of the Cholera. Before proceeding, however, to particulars upon this important point, it may not be altogether unnecessary to state that, during the former invasion of the epidemic in 1831, the establishment of temporary *special* hospitals was found on experience to be not only of little service, but often positively injurious. For, besides the unnecessary alarm caused both to the patient and his friends by his being carried off to a "cholera hospital," and the false impression left upon the public mind that, if such were not done, the spreading of the pestilence would greatly increase, the very act of removing to any considerable distance a person seized with the disease often produced such a prostration of strength that he never recovered from it. A far wiser plan will unquestionably be, that patients should be treated on the spot where they are taken ill, if the attack be sudden and severe; and, as the means to be used are abundantly simple and generally within reach, prompt attention might immediately be paid, if the nearest medical practitioner were summoned without delay. Of course, on the public should fall the expense thus necessarily incurred in the case of the destitute poor; nor is this likely to be objected to, when it is considered that the very considerable outlay, formerly incurred in the erection of hospitals and so forth, may be entirely avoided. But this only *en parenthese*. I need scarcely say that, while advocating the system of immediate attendance upon the poor at their homes, in preference to the plan formerly adopted, I am not in the least insensible to the superior comforts and conveniences for appropriate treatment that can always be had in any of our established hospitals;* and that if the sick can be promptly received into them without loss of time, so much the better. All

* Of course, it is taken for granted that cholera patients would be readily admitted into all our hospitals and infirmaries, without any apprehension of spreading the disease. Indeed, medical men have, of late years, much relaxed in their fears as to receiving even persons affected with decidedly infectious fevers into the wards of a general hospital; and, at the very same time, they have begun to question the propriety of having *special* establishments for the reception of such patients. There is certainly more danger of infection spreading by congregating a number of comparatively mild cases within a limited space, than by admitting one or two malignant cases into a large well-ventilated ward where there are other invalids.

that I insist upon is the importance of medical assistance being procured as soon as possible after the setting in of the symptoms, and of the patient's strength being husbanded by all unnecessary fatigue being cautiously avoided. The loss of half an hour at the commencement of the attack may not be compensated by the persevering use of the most appropriate remedies during ten or twenty hours afterwards. And now for a brief enumeration of these remedies; only premising that the following remarks are intended to apply more especially to the early part of the cold stage of the disease, when the discharges have begun to assume a watery or serous character, the pulse is weak and faltering, and the general vital energies are much depressed.

The first thing to be done is to have the patient at once stripped and enveloped in warm blankets. The application of bottles of hot water, bags of hot salt or bran to the feet, between the legs, and along the course of the spine, will always be useful in increasing the warmth of the general surface. This is a point of great importance; as the cutaneous circulation is all but arrested, and the blood is consequently accumulated in the internal viscera. The sympathy between the skin and the alimentary canal is known to every one by experience. Cold feet will often cause severe pain in the stomach and bowels; and, on the other hand, indigestion and diarrhœa are almost invariably attended with a chilly state of the surface. The removal of the exciting cause in either case will speedily relieve, or altogether dissipate, the superinduced symptoms. How important then it must be to act upon this therapeutic principle in a disease like Cholera, in which the whole body is marbly cold, and the gastro-intestinal canal is so strangely and violently perturbed!

This preliminary point being attended to, what is the physician to do next? I have no hesitation in recommending—and the recommendation is based not only upon long meditation upon the subject, but on the results of some experience during the epidemic of 1832 in London—the immediate exhibition of *saline emetics*, as was first (I believe) employed on a large scale by Dr. Searle at Warsaw. Without going so far as to say that the incessant vomiting, which generally constitutes so distressing a symptom of the disease, is a medicative effort of the system

either to relieve itself of offending matters, or to rally the stagnant state of the circulation, I have not a shadow of doubt that the practice, so often pursued, of seeking to arrest it at once by the exhibition of large doses of opium and other narcotico-astringent remedies, has been the cause of much disappointment, and not unfrequently too of very serious mischief. And here let me remind my professional brethren that, in very many instances of spontaneous vomiting, by far the best remedy is neither opium, prussic acid, creosote, effervescing draughts, nor any other of the usually-prescribed means, but a simple emetic. And why?—Because the morbid condition is often kept up in consequence of the contractions of the stomach (and other co-operating muscles) being only partial and imperfect—ineffective, in short, to produce what Nature is seeking to attain. When once the organ is made to contract vigorously and effectually under the operation of an emetic, its inverted action ceases, and the distressing symptom is relieved. But, whatever explanation we choose to adopt, the truth of the fact cannot be gainsaid: daily experience affords the proof. And what holds good in diseases of less formidable severity, is quite as applicable in the treatment of the Cholera. Indeed, the very nature or character of the vomitings in this frightful malady seems to me to point to the practice now recommended. The ever-recurring discharge of the enormous quantities of watery fluid from the stomach looks more like the gushings out from a vessel overflowing to fulness, than the forcible expulsion of a living organ's contents by the contraction of its parietes. There is little or no retching or straining, as in ordinary vomiting; the act is one rather of simple disgorgement than of strong and convulsive contraction. The curative indication therefore is to induce a more energetic action of the stomach, diaphragm, and other muscular parts which co-operate in ordinary vomiting; and in no way can this object be so effectually accomplished as by the exhibition of a stimulant emetic. Common salt is at once the most convenient and the most useful one that can be employed. Let from a dessert to a table-spoonful or more be dissolved in a tumbler-full of water, and drank off immediately; and let the dose be repeated again and again at short intervals, if it be speedily rejected without having induced the forcible contractions we desire. When this object is once fully attained, the incessant vomiting, which existed before, will, in very many cases, be found to be remarkably abated. Then is the time for the application of a stimulating *epithem* upon the abdomen, and especially over the epigastrium; and certainly nothing is better for this purpose than that which has been so strongly recommended by Dr. Copland, viz. a large flannel, wrung nearly dry out of very hot water, and then moistened with spirits of turpentine: a portion of laudanum may be added to it at the same time. In many cases, a strong sinapism will answer very well. The relief obtained from such applications is often most decided; not only is the irritability of the stomach sensibly quieted, but the excruciating cramps of the abdominal muscles are at the same time decidedly relieved. If, by the means now mentioned—outward warmth, saline emetics, and stimulant fomentations to the abdomen—the vomiting has become much mitigated or checked, the incessant purging also will often be found, at the same time, to have diminished. And this indeed is just what we might expect; seeing that a diarrhœa or relaxation of the bowels may frequently be very promptly arrested by exciting vomiting, and this, too, (as has been remarked by Sydenham,) even when direct astringent and opiate medicines have failed. Here, then, is another advantage to be derived from the use of stimulant emetics; nor are we to forget the potent effect which the violent straining, which always accompanies the act of forcible vomiting, has in equalising the general circulation, in determining the blood to the surface, often nearly exsanguine, and also in bringing on a tendency to sleep. Should the purging continue, notwithstanding the abatement or cessation of the vomiting, the indication will be to act, in reference to the one symptom, upon the same principle which guided our practice in reference to the other. The bowels should be stimulated to energetic contraction; it is in this way only that the enormous draining from their mucous surface can be safely as well as effectually arrested. To attain this object, it will be wiser, on most occasions, to trust to enemata rather than to medicines exhibited by the mouth, in order to avoid all unnecessary distress of the irritable stomach. The injection may consist either of a strong

solution of salt, or of spirits of turpentine, mixed with gruel or any other convenient vehicle. It is doubtless well known to most medical readers, that one of the earliest and surest signs of favourable omen, in a case of Asiatic Cholera, is the appearance of any thing like bilious or fæcal matter in the dejections. Hence it is that the practice of some of the most experienced men in the East Indies has been primarily and mainly directed to this end, and undue reliance has been placed upon the administration of enormous doses of croton oil and other drastic purgatives, either alone or in combination with opium. The suppression of the biliary secretion, as well as the atonic inaction of the gall-bladder (which has in many cases been found on dissection full of bile), is however not so much the cause as one of the effects of the disease. Still it is certainly quite right that our remedies should be of such a nature as not to interfere with, or arrest, the excretion and elimination of the bile; and this, indeed, is one of the very reasons that has influenced me in so strongly recommending the early use of powerful emetics, and consequently in condemning the exhibition of large doses of opium, in the treatment of Cholera. If opium is to be employed—and that it may often serve some useful purpose is not denied—let it be almost exclusively used as an outward application, or let it be administered only in small doses, and in conjunction with other remedies.

Under very many circumstances, a mild preparation, like the *tinct. camphoræ comp.*, is greatly preferable to the stronger laudanum. It is quite true that even enormous doses of the latter, or of crude opium, have often been given without any narcotic or stupifying effects being produced; but then these have very generally been cases in which the patient speedily sank, and when the drug had little more effect upon the system than the same quantity of wine or brandy would have had. Should, however, the immediate symptoms of the disease be overcome, and the system make an effort to rally from the prostration to which it was reduced, then will the pernicious effects of the opiate treatment be very generally experienced. There is a marked tendency to cerebral oppression, and even to coma; the biliary and other intestinal discharges are not readily brought back to a healthy state; and the urinary secretion is with difficulty re-

established. But, if there was no other argument against the immoderate use of opium in the treatment of the cold stage of Cholera, the circumstance of its very general failure, in past experience, either to check the vomiting and purging or to mitigate the dreadful cramps, ought surely to induce us now to have recourse to less objectionable remedies.

Whenever the vomiting has ceased or become sensibly abated, it will be prudent to begin the administration of some preparation of mercury. From five to ten grains of *calomel*, or double this quantity of the *hydrargyrum cum cretâ*, in combination with the carbonate of soda or magnesia, should be given immediately; and the dose repeated every three, six, or ten hours, according to the circumstances of the case. *Camphor* may often be advantageously added to these powders; or the different substances may be made up into pills with any of the warm essential oils. The effect of this treatment will be to excite the hepatic and pancreatic functions, and to induce a more healthy condition of the whole intestinal canal. The occasional administration of a stimulating enema will, at the same time, serve to bring down the vitiated matters, which, I need scarcely say, are almost always found to stand in need of evacuation after the immediate symptoms of the disease have been subdued.

To allay the intense thirst—which is often accompanied with a sense of burning heat in the region of the stomach—that is almost always present in cases of Cholera, effervescing draughts prepared with the carbonate of ammonia, soda or seltzer water, iced water, water acidulated with the sulphuric or some other mineral acid, light well-fermented beer, or, in short, whatever may be most grateful to the patient, should be given without restriction; only cautioning him to take small quantities very often, rather than large draughts less frequently. On the whole, it is better to avoid strong and spirituous stimulants, if these simple beverages suffice; and, in nine cases out of ten, the latter will be found to be quite as refreshing and exhilarant as the former, even when the system is in a state of great depression.

In the treatment of a disease like Cholera, the ultimate as well as the immediate effects of our remedies should always be kept in view; and, considering the marked tendency there is to the supervention of typhoid phenomena upon the cessation of the

primary symptoms, the prudent physician will prefer the use of those means that may be fairly viewed as counter-agents rather than as provocatives of the consecutive mischief. Doubtless, the suppression of the biliary and urinary secretions, and the consequent retention in the system of effete and noxious matters, that are continually being eliminated from the blood, form one of the chief causes of this secondary Typhus; and there is good reason to believe that the tendency to its occurrence will be found to be exactly proportionate to the difficulty, or delay, with which these important functions are re-established. Of course, therefore, special attention will always be directed to this point, immediately after the subsidence of the proper choleraic stage. It is unnecessary to particularise the appropriate remedies to be employed for such a purpose. Lastly, in closing these remarks, I would again urge the necessity of husbanding the patient's strength with all possible care. Among other precautions, the patient should never be allowed to rise up, far less to leave his bed, when the calls of Nature require relief. The exhaustion, caused by the neglect of this simple rule, has, in not a few cases, proved almost instantaneously fatal.

Such are the principles and general plan of treatment, the judicious following out of which promises, in my opinion, by far the best prospect of advantage in combating the disease which we have been considering. They are not proposed as either new or peculiar; for I am well aware that each and all of the remedies enumerated have been recommended and employed by others. My chief object has been to point out and explain their mode of operation, and to give a connected view of the *when* as well as of the *wherefore* of their use;—in other words, to mark the proper time for their employment, and the indications that are sought to be fulfilled by them. There is one general observation that I would particularly press upon the attention of the reader, seeing that it is not altogether in accordance with what is frequently laid down in medical works upon the subject. It is said that the activity or potency of our remedies should be commensurate with the intensity and malignant nature of the disease we have to contend with. Acting doubtless upon this principle, some practitioners have had recourse to the most violent—might I not even

say outrageous?—remedies; such as large doses of strychnine and prussic acid, the application of the actual cautery along the spine, venæsection in the stage of collapse, not to mention the injection of enormous quantities of saline fluid into the veins. Such are not the means, I venture to affirm, which thoughtful and experienced observation will ever recommend. Promptitude in the use of simple measures is a safer guide of practice in a disease like Cholera than boldness and activity in that of energetic ones. The precept of Hippocrates should never be forgotten, that the great object of the physician or *healer* (ἰητρὸς), should ever be "to benefit his patient, or at least to do him no harm," (ὠφελεῖν, ἢ μὴ βλάπτειν)—a precept of profound and most instructive import, and which cannot perhaps be more effectually impressed upon our minds than by reading the comment which Galen wrote upon it:

"There was a time when I regarded these few words as unworthy of Hippocrates; it seemed too obvious that the duty of the physician is to seek to relieve the sick, or at least not to injure them. But after having seen many celebrated practitioners justly blamed for what they had prescribed,—such as blood-letting, baths, purgatives, wine, cold water, &c.—I then understood that Hippocrates had committed the same mistakes, like many others who were his contemporaries. Since that time, I have not only deemed it necessary, in prescribing any powerful remedy, to endeavour to know to what extent the patient might probably derive relief, but I have never administered anything without taking all possible precautions not to do harm, in case the prescription might miss its end. Some physicians, like men engaged in throwing the javelin, prescribe remedies which, if they fail, are full of mischief to the patient. Beginners will, I am certain, believe, as I did myself, that the precept of Hippocrates is not worthy of him; but the more experienced, I am not less sure, will understand its full bearing; and, if ever they chance to injure their patients by the unseasonable administration of an active remedy, then will be the time more especially that they appreciate the meaning and the deep importance of the advice which Hippocrates has left to them." Is there not some reason to suspect that the truth of the above sage advice was not recog-

nised, as it deserved, either by ourselves or by our professional brethren on the continent, during the invasion of the disease sixteen years ago? Without casting the blame on any, it may not be unprofitable that medical men should be reminded that the ratio of mortality in our own land was nearly as high as in some countries where little or no professional assistance was to be had, and where, consequently, the malady was left to its own unopposed course. The following Table, drawn up by Dr. Merriman from official returns, too surely proclaims this humiliating truth:

	Cases.	Deaths.	Recoveries.
England	49,594	14,807	33,790
Scotland	20,262	10,650	10,549
Wales	1,436	498	938
Isle of Man	276	146	130
	71,508	26,101	45,407
London and its Vicinity	11,020	5,275	5,745
	82,528	31,376	51,152
Ireland, up to March 1, 1833	54,552	21,171	33,381
	137,080	52,547	84,533

It thus appears that the ratio of mortality in the entire number of cases was about 38 per cent: being, in England (not including London) in rough numbers, 29 per cent; in Scotland, 52; in Wales 34; in the Isle of Man, 52, and in Ireland 38 per cent. In the Metropolis, it will be observed that nearly one-half of the cases proved fatal! What the relative mortality was in other countries in Europe, it is not possible now to determine; our information upon this point being very imperfect. Perhaps we should not be far wrong in fixing it at from a third to a half. And this seems, hitherto, to have been about the ratio during the present epidemic; for, although one public journal (*Morning Chronicle*) stated, a week or two ago that, "according to a rough estimate, it is believed that nearly 100,000 persons have suffered from cholera in Russia, and that from 22 to 24,000 of these have died," we may suspect that this calculation must be much below the mark, if we are to trust the separate reports from different parts of the empire. Of 30,000 cases, that have occurred in Astrakan, among the Cossacks of the Don, in Saratoff, Kasan, Woronesch, &c. fully one-half are said to have proved fatal. As yet, we cannot say which statement is the more correct. Fewer persons, indeed, have been attacked than in 1831, but it seems doubtful whether the relative number of recoveries has been greater.

There is a point in the natural history of the Cholera, (and indeed of almost all epidemic diseases) which it is most necessary to bear in mind, when we seek to ascertain the *real* effects of medical treatment upon its ravages;—I allude to the fact that the malignancy of the disease is usually much greater immediately or very soon after its distinct appearance in a place, than at a later period of its existence there. Its sojourn may vary from a week to a month, or to several months; but whatever it may be, the important truth is, that the intensity or virulence of the poison—estimated by the *relative* (not the actual) number of deaths to cases—is most decided during the first-third or so of the period. Of course, therefore, a less amount of success is to be anticipated in the early than in the later stages or epochs of its duration. Upon this and some other topics full of interest, I might have enlarged, had not the limits which I have prescribed to myself prevented my doing so at present.

In conclusion, I would again earnestly impress upon the public the great importance of immediate attention being paid to every, even the slightest, symptom of disordered stomach and bowels—such as sickness, diarrhœa, or colic—during the prevalence of the epidemic, should it appear among us; as it has not unfrequently happened that the neglect of the premonitory symptoms has been suddenly followed by a rapidly-fatal attack of the disease.

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SKETCH

OF

THE OPERATION

AND OF SOME OF THE MOST STRIKING

RESULTS OF QUARANTINE

IN

BRITISH PORTS,

SINCE THE BEGINNING OF THE PRESENT CENTURY.

BY

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1853.

THIS Paper was read before the Epidemiological Society during the present year. It has already appeared in the pages of the ASSOCIATION MEDICAL JOURNAL; but as many persons out of the profession take a lively interest in the subject of quarantine, I have directed a number of copies to be prepared in its present form for the convenience of more general circulation. It is my intention to follow out the subject, and illustrate it by reference to the results of the system in Foreign Ports.

LONDON, FITZROY SQUARE,
JULY 1853.

OPERATION AND RESULTS OF QUARANTINE IN BRITISH PORTS SINCE THE BEGINNING OF THE PRESENT CENTURY.

THE subject which I have the honour to bring this evening under your notice is one which seems to me to belong, in an especial manner, to a society whose declared aim is to investigate the natural history of epidemic diseases, with the view, of course, to the discovery of the most effectual means to control their development, arrest their spread, and mitigate their fatal malignity. Its importance will be recognised by all, when it is considered that quarantine professes to be a precautionary plan or process, whereby pestilences may be altogether kept at bay, and countries be thus preserved from the invasion of their destructive agency. No theme, therefore, in state medicine more deserves our attention; and just in proportion to the importance of its bearings, is it necessary that our opinions be based upon reason and truth,—in other words, upon sound conclusions drawn from a sufficient number of well observed and faithfully recorded facts. Nor let it be forgotten that, independently of the immediate practical consequences involved in its right solution, this is one of the principal questions about which medical men are necessarily brought into direct contact and conference with the higher departments of public

life; and on which the value of their advice is not confined within the circle of mere professional criticism, but will be subjected to the scrutiny of all who are interested in the freedom of international intercourse, from the statesman and the legislator down to the merchant and the traveller.

And yet, strange to say, there is not a topic in medical literature which has been so imperfectly handled, or on which there is less reliable evidence on the one hand, and a greater amount of extravagant and absurd assertion on the other. Unfortunately, too, there is not a single work in existence, as far as I know, to which any one seeking for detailed and trustworthy information upon the subject of quarantine can be referred. It is not so much as even named in the *Cyclopædia of Medicine*, published in 1835; while Dr. Copland, in his elaborate *Dictionary*, has, under the head of Protection from Pestilences, treated it with so little precision and clearness, and under the manifest influence of so strong a bias to particular one-sided views, that the reader finds himself both perplexed and unsatisfied. Nor has the subject fared better in the standard encyclopædias of general information. In the last edition of the *Encyclopædia Britannica*, published so recently as 1842, there is the most meagre mention possible—not exceeding a couple of dozen lines;—although the commercial bearings of quarantine are so important, that it has been estimated that a loss of little short of a million sterling is thereby annually inflicted on our shipping; and even this brief notice is not free from palpable error. Occasionally, at distant intervals, an article in a literary review has drawn public attention to the general question, or to some particular details; but never with the scope of a systematic or comprehensive inquiry.

You thus see how imperfectly the subject has hitherto

been investigated; and you will probably all agree with me that it is high time, alike for the credit of our profession, which claims to guide public opinion upon such matters, as well as for the general interests of the community, that an attempt be made to ascertain the real state of our knowledge as derived from past experience, with the ulterior view of finding out, if possible, a clue to guide us to the truth through the meshwork of discordant and contradictory statements and opinions in which it is involved. This entanglement is necessarily not a little increased by the circumstance, that it is not to one disease alone, but to several—and these varying too from each other in many features of character,—that the relations of quarantine have to be considered. Hitherto, it has been almost exclusively in reference to the oriental plague (against which quarantine was originally instituted) that the subject has been discussed. All the parliamentary evidence that has at any time been published in this country, is, as far as I know, limited to this one topic; and, indeed, so little have the bearings of quarantine to other diseases been generally thought of, that the writer in the *Encyclopædia Britannica*, a distinguished professor too of medical jurisprudence, does not so much as even name any other besides the plague. The plague, however, constitutes but one item in the inquiry; and even supposing that we had arrived at anything like decided conclusions respecting this form of pestilence, we should then have settled but a single point. How stands the question of quarantine with yellow fever?—with Asiatic cholera?—not to mention typhus fever, and the whole tribe of the exanthemata. Probably, most of my hearers are aware, that in very many places where quarantine restrictions exist, they are enforced, not against one only, but against each and all of the diseases now enumerated.

Upon this, however, as indeed upon every other head,

the most ridiculous and contradictory practice is followed in different countries, and often too in different ports of the same country. Without descending to particulars, it cannot but be obvious that, to do anything like justice to the subject, a very wide and most varied field of examination is necessary ; for, while each disease requires to be considered in reference to its own ascertained laws of propagation and diffusion, it is of the utmost importance to compare these laws together, to ascertain wherein they differ, and wherein they agree ; with the view of determining how far the diseases are controllable by quarantine restrictions. The work is a large, and perhaps not a very easy one ; but until it be fairly done, in a spirit of calm and conscientious inquiry, the medical profession fails, I think, to perform a duty which it owes to the public service. On the present occasion, I must impose upon myself much narrower limits, and shall confine my remarks to three only of the diseases alluded to ; viz., the plague, yellow fever, and the Asiatic cholera. And here let me say, that it is not my intention to lead you into the troubled waters of controversy, respecting any single point in the purely medical history of these diseases. The object of this paper is not to discuss any theory or to balance any dispute, but simply to narrate with thorough truthfulness facts and occurrences, as they have been recorded by trustworthy writers, leaving it to each gentleman to form such conclusions as the data may seem to warrant. Let me but offer one suggestion ; viz., that in seeking to arrive at the truth in such an inquiry, we should,—while keeping our minds free from all preconceived opinions, and unperplexed by any other debateable questions save the one immediately under consideration,—apply the same laws of evidence, and follow the same mode of reasoning to discover the truth in respect of the origin of an epidemic disease, as we recognise to be necessary in the

investigation of the causes of other natural phenomena, or in forming a judgment from circumstantial evidence in a case of criminal prosecution. Let facts and occurrences be looked at in their own light, and not through the coloured spectacles of a preadopted creed ; let us avoid placing reliance on hearsay unsifted testimony,—let us be on our guard against eking out imperfect and unsatisfactory information by mere conjectures,—and let us cease to have recourse to that too common phrase, "it is highly probable", in our endeavours to trace a connexion between antecedent and subsequent phenomena. It would be well, I have often thought, if the Scottish form of verdict, "not proven", were more steadily before the minds and more frequently on the lips of medical juries, on a variety of occasions.

Quarantine is defined, very vaguely it must be acknowledged, in the *Encyclopædia Britannica*, to be "a trial which ships must undergo when suspected of pestilential infection". If the trial alluded to were confined to the ships alone, it would be a simple and comparatively a very inoffensive procedure. But this is a very minor part of the quarantine system. It is not the ship alone, but all and everything on board, animate and inanimate, that is subjected to the said trial ; which trial consists in an enforced detention and seclusion for a period of from two or three to forty days (the word *quarantine* indicates the latter number), followed in many instances by the fumigation of persons and things, before they are set at liberty. Bear in mind too, that it is not necessary that any disease should actually exist on board at the time of the vessel's arrival, or even that any case whatever of illness should have occurred at any time during the voyage. It suffices, if she has come within a specified time from a place where disease is reported to be. This circumstance alone is generally regarded as an adequate reason for the imposition of quarantine restrictions, on the

ground, either that disease may be present in an incubative form in the system of some person or another among the crew or passengers, or that its material cause—the *materies morbi*—may be adhering to some article or another on board.

Quarantine therefore is not (as is sometimes alleged by those who seek to make light of its grievances) the mere detention of the sick and infected, with the view of preventing their being landed at once and being taken wherever they or their friends may choose, without restraint or any regard to sanitary precautions. It applies equally to the well and healthy; nor is any distinction ever made between different individuals in point of susceptibility or liability to become attacked. All are treated alike; although, in the case of yellow fever, some may have had the disease and others have not; or, in the case of small-pox, some may have been vaccinated, while others are wholly unprotected. Quarantine bears to simple sanitary prophylaxis the same relation, as a lazaret does to an ordinary clean and airy hospital.

The term is sometimes applied to the precautionary measure of isolating the sick on shore, or of establishing a cordon around a district, in the hope of confining a pestilence and arresting its progress. At other times, it is used to designate voluntary seclusion by individuals in health within their own dwellings, during the prevalence of sickness. But it would be much better if the word were confined to its original acceptation, viz., that of a detentive coast-guard against the importation of disease by shipping. It is in this restricted sense that it is employed in the following observations; my aim being to ascertain how far the system, as hitherto practised, has succeeded in the object for which it was established. Small islands present, of course, the most favourable opportunities for inquiry.

As to the various measures which have been adopted for the arrest of diseases, when they have found their way into a country, and as to the results of these measures, this topic does not come within the scope of the present paper.

I now proceed to my statement of facts; and, first, respecting the plague. As my narrative is purposely confined to the present century, I have no instance to mention until we come down to the memorable outbreak in Malta, in 1813. Two or three prefatory remarks, however, may not be misplaced. It is a fact worthy of notice that in Egypt, Syria, and Turkey—the countries which are always regarded as the parent lands of plague—there was a remarkable lull, all but a complete cessation, of epidemic plague between 1803-4 and 1812. We shall afterwards see that other epidemic diseases seem to have been similarly affected in remote countries during this interval. In 1812, one of the most formidable outbreaks of the pestilence that was ever known occurred in Constantinople; nearly 150,000 persons perished. Egypt also suffered rather severely in that year; and Smyrna on the west coast of Asia Minor, and Odessa on the Black Sea, not to mention other places, are also known to have been attacked. In the following year, 1813, the pestilence appears to have become more widely diffused; for we find that it prevailed more or less extensively in Wallachia, Roumelia, Albania, and Greece, all provinces then of Turkey in Europe. There was also, at the same time, an unusual prevalence of malignant fever over the greater portion of Europe; and we shall afterwards see that, in this year, a fresh outbreak of yellow fever took place in different parts of Spain. At Malta, the spring season was remarked to be a very sickly one; sudden deaths were more frequent than usual; but the most noticeable feature of the prevailing medical constitution was the remarkable ten-

dency that existed to furuncular and other forms of unhealthy outward inflammation. "Every whitlow festered, and every scratch became an ugly sore. A tight shoe was sufficient to produce a livid boil with symptomatic bubo. The military hospitals were crowded with such cases."

I will now detail the ascertained facts connected with the development of the pestilence in the island, which, it may be remarked, was believed to have been exempt from the plague for one hundred and twenty years. Nowhere perhaps is a quarantine establishment more complete in all its details and appliances than at Malta. The quarantine harbour is quite distinct and separate from the general harbour; there is an extensive lazaretto for the reception of the sick or suspected; and there is a regular staff of health officers. In consequence of the island being jealously watched by the Neapolitan and other Mediterranean States, which are ever ready to put her in quarantine upon the slightest pretext, the vigilance of all concerned is always on the alert.

On the 28th of March, a vessel arrived from Alexandria, having a foul bill of health in consequence of the plague existing in that city. Two fatal cases of plague had occurred on board during the voyage. Her cargo consisted of flax. Immediately upon arrival, her crew were sent on shore to the lazaret, and the vessel was placed under the strict charge of health guardians, to prevent all communication either with the shore or with other vessels. The captain and one of the crew sickened in the lazaret on the 1st of April; both died on the 7th. In consequence of this, it was at first proposed that the vessel with her cargo should either be burnt, or taken out to sea and sunk; a mode of procedure that had been more than once resorted to at Malta for the public security.* A less summary plan to get her out of the way

* The same decisive measure has been occasionally had recourse to on our own coasts. At the beginning of the present century, three vessels from

was however agreed to, viz., to send her back forthwith to Egypt, with her cargo untouched. Accordingly a fresh crew were put on board, and she was dispatched on the 10th of April. It is an interesting fact, that not a single case of sickness occurred, either on board during the ten days' voyage back to Alexandria, where she arrived in safety, or among the people engaged in unloading her in that port.

On the 16th of April, a young girl, the child of a shoemaker living in one of the low unhealthy parts of Valetta, at a distance from the harbour, sickened with fever; she died in the course of a few days. The pestilential nature of her case was not suspected at the time. The mother was next attacked; in her case, the fever was accompanied with swelling of the inguinal glands. Suspicions now began to be excited, and rumours to be circulated, that the plague had made its appearance in the town. As it does not belong to the object of this paper to follow the subsequent course of the disorder, I shall say no more than that it is admitted by all who have written upon the subject, that, ere the Committee of Public Health had quite decided as to the real nature of the visitation, "the insidious disease was insinuating itself in every angle of the city, in places remote from the scene of its first appearance". The question for us to consider is, how did it find its way in, presuming

Mogadore were sent round to the Nore, and there, by order of the government, upon the advice of the then quarantine authorities, sunk in deep water, along with their cargoes, consisting chiefly of goat-skins. The country had to pay upwards of £20,000 to the owners for this act of sanitary precaution! Something of the same sort was done at Stangate Creek in 1814. A cargo of skins, being deemed incapable of effectual expurgation from the possible retention of plague miasmata, without great risk to the men employed, was ordered to be sent on shore and burnt. In 1813, an infected vessel was submerged for a time in Malta harbour. No later than 1846, a work on Plague and Quarantine was published in London by a military medical officer, who had been in Corfu during the prevalence of the pestilence there; therein it is gravely recommended that, "generally speaking, it will be best, and perhaps the cheapest way in the end, to destroy the ship and cargo at once."

that it was imported by the infected vessel, notwithstanding all the rigorous precautions which had been taken?—and, moreover, how came it to appear first, not among the health officers who had been put aboard of her, or even among the servants of the lazaretto where the captain and one of the crew had sickened and died, nor yet in the immediate neighbourhood of the *parlatorio* or landing-place, where the only communication between vessels in quarantine and the town is permitted, and that too through a grating and under the eye of officers, but in a locality at a considerable distance, and among people wholly unconnected with the shipping? A rumour indeed got afloat, long after the event, that the father of the girl who was first attacked was in the habit of eking out his small gains as a shoemaker by acting as a smuggler, and that he had managed, somehow or other, to get a package of new linen from the vessel. It would occupy too much time to narrate the odd gossiping sort of evidence, on which this rumour was based. Suffice it to say, that it was never shown that the suspected package had ever been traced to the poor man at all (he died at an early period of the pestilence); nor indeed that any such package or anything else had ever been abstracted from the vessel. All that Sir A. B. Faulkner, the principal medical officer of the forces in Malta at the time, and who had made it his business to inquire into the circumstances upon the spot, ventured to say was, that he thought "it an event not improbable that some of the family might have got goods from the vessel". The story was, however, believed by the quarantine authorities, and has been more than once repeated in print. It should, however, be known, that Dr. Calvert, physician of the forces, who was then in Malta, and who subsequently communicated a detailed account of the pestilence to the Medico-Chirurgical Society, regarded it as wholly groundless. "It

is next to an impossibility", says he, "that it could have been brought in by clandestine intercourse. The crew of the infected ship was securely locked up in the lazaret; guards were placed upon the ship itself as long as it continued in the harbour; while every suspected person was seized and carried to the lazaret. But all was to no purpose: the disease seemed to laugh at their exertions, while it jumped from house to house, and from street to street. Those who had no communication together, as well as those who had, fell alike victims to its fury. Nothing could bring to light the way in which the infection was brought. Surely, if any evidence had been forthcoming, it would not have been kept back, when a free pardon was offered to the delinquents, besides a reward of a thousand scudis; or, if this was not sufficient, the dreadful anathemas that issued from the church could not have failed to produce confession."* The late Dr. Hennen, too, when medical inspector at Malta, after having examined with the utmost care all the official documents on the subject in the archives of the island, and collected the evidence of surviving residents who could give any information, came to the conclusion that the story about the smuggled linen was not to be credited; and Dr. John Davy, who subsequently occupied the same post, and whose attention was specially called to the results of the quarantine establishment, states, in his interesting work on Malta and the Ionian Islands, that the mode in which the pestilence was introduced "is still unexplained in a satisfactory manner".

I must now request you to accompany me to the little island of Gozo, distant about one mile from Malta. It had remained quite healthy throughout the dreadful visitation of the latter, in consequence, it was believed at the time, of

* Trans. Med. Chir. Soc., vol. vi. p. 56.

all intercommunication having been subjected to the most vigilant and rigorous quarantine. Great, therefore, was the surprise, when a man died suddenly in Gozo, with suspicious symptoms, in the last week of February 1814. His daughter sickened a few days afterwards; she also died; and, within a few days, several inhabitants of the village where they resided were attacked. The following explanation of the mode in which the disease was thought to have been introduced has been given. The man first attacked had shortly before come from Malta, bringing with him a box of new wearing apparel, which, it was alleged, he had concealed from the knowledge of the expurgators, by having buried it some months previously, when the plague existed in his neighbourhood. It had thus escaped proper purification. Sir T. Maitland, the Governor of Malta, in his official dispatch to the Colonial Minister on the subject, after recapitulating all the circumstances connected with the appearance of the disease in Gozo, expresses his opinion thus: "Although I should not be able to prove it in law, yet I have a perfect moral conviction that it was carried into the island of Gozo in the following manner"—viz., that as now described. Sir A. B. Faulkner appears to have had some doubts upon the subject, for he says: "Whether the above account of the box be strictly authentic or not, it is certain that the plague broke out immediately in the family after the arrival of their relative" from Malta. Dr. Calvert says: "A man indeed did go from this neighbourhood (near Casal Curmi) to Gozo, and was the first in that island who fell a sacrifice to the disease; but, as to his digging up a box, this was an idle report, and could not be substantiated, as I was confidently assured from the best authority."

Fortunately, the disease did not spread much, and soon ceased, after carrying off about sixty or seventy persons.

From Malta and Gozo, I now pass to the Ionian Islands, where the pestilence made its appearance at the end of the following year, 1815. Throughout the whole of that year, it had continued from the previous one in different parts of Albania, on the coast of Dalmatia, and along the shores of the Gulf of Lepanto. Ample warning had thus been given, that the dreaded foe was not far distant; and, indeed, Mr. Tully, one of the quarantine medical officers in Corfu, had been sent by the British government to Greece, with the view of gaining the most exact information. Moreover, the experience of the recent disastrous visitation of Malta had served to increase the vigilance of all the health authorities. As Mr. Tully has written a minute history of the disease in the Ionian Islands, we are enabled to follow it step by step. The place first attacked was the malarious district of Leftimo, in Corfu. Mr. Tully was at once dispatched thither, to organize measures for arresting the disease. But with these we have not at present to do. As to the origin or mode of introduction of the disease, this was then, and for a long time afterwards, quite inscrutable. The residents attributed it to the agency of an evil spirit; in other words, to endemic or indigenous causes; and Mr. Tully himself, in one passage of his work, states that he shared the opinion of those who believed that it was generated on the spot. It would seem, however, from the rest of his narrative, that, to use his own words, it "was ultimately ascertained, by the most undoubted proofs, to have been introduced through the medium of infected goods, which, by a strange combination, had remained on the island, under lock and key, for a considerable time." The goods alluded to consisted of a box, containing an opera hat, shirts, and a quantity of new silk handkerchiefs, with several copper kitchen utensils, which a smuggler was said to have left in Leftimo a year and a half before the appearance of the plague there, but

was only opened shortly before the first cases occurred. Such is the alleged mode in which the disease managed to evade the quarantine at Corfu. It continued in the island until the May or June of 1816, when Cephalonia, another of the Ionian group, began to be infected. Mr. Tully was of opinion that it was introduced there by some men who had come from the Albanian coast, where the pestilence had now existed for eighteen months and upwards. They had been detained in quarantine for seven days, and had remained quite well all the time. But it was afterwards alleged that one of the party had brought with him some clothes, which he had stolen from two Turks, who had died. The story is, at best, a very lame one; nor was Mr. Tully himself quite satisfied about it. A more important fact is, that, while the plague existed in one part of the island, a most deadly form of endemic fever, with very similar symptoms, prevailed among the troops recently arrived from England in another.

It does not appear that any other of the Ionian islands, save Corfu and Cephalonia, were visited by the pestilence. The immunity of Santa Maura is the more remarkable, as it lies between Cephalonia and that part of the Albanian coast whence the disease was supposed to have been derived.*

Since 1816, the plague has not appeared, as far as I am aware, in any of the British possessions in the

* A recent intelligent writer, who was detained for a week in quarantine at Santa Maura, upon landing from Albania, although that country was in perfect health at the time, describes the lazaret in which he was confined as the most miserable shed imaginable. "In short," says he, "during the whole range of my travels in Asia and Europe, I never met with the equal of this for the utter wretchedness of its accommodation and the insalubrity of the situation." The result of the sufferings he experienced during his detention was a severe attack of fever. (Spencer's *Travels in European Turkey, etc.*, 1851.)

This is but an instance of what is continually taking place in many of the lazarets in the East. It is surely a disgrace that such an enormity should exist in a British colony at all events, in the present day.

Mediterranean, except a few imported isolated cases in the lazaret at Malta. To these I would now invite your attention for a few moments. Fortunately, the records of the quarantine establishment there, since the island came into the possession of Britain at the beginning of the present century, enable us to ascertain the truth. It appears that no vessel having plague on board arrived in Malta harbour, and that no case of the disease occurred in the lazaret, from that period down to 1813. Since the cessation of the pestilence in that year to 1845, twelve vessels either actually infected or suspected have arrived, and about fifty cases of what has been regarded as plague—although in many of them the characteristic symptoms of the disease were absent, and they would have been recorded as cases of petechial typhus, had they not occurred in individuals from plague countries—have been treated in the lazaret. Now, it is an extremely interesting fact that of all the persons engaged in attending upon these sick, or who had been put on board the infected vessels as health guardians (and the number of these persons must have considerably exceeded a hundred) only four were attacked with any illness, and but one died. Two of the four men had been put on board a foul ship from Alexandria in 1821; they soon recovered. The other two cases occurred in men who had volunteered their services to be confined in the lazaret with a crowd of poor filthy Moors, on their way from Egypt to the Barbary coast.* It was one of these cases which proved fatal. The complete im-

* The experience of the lazaret at Marseilles accords in a striking manner with that of Malta. No infected vessel had arrived there, and no case of plague had been seen in the lazaret from 1796 down to 1819. Between this year and 1846, only two infected vessels arrived; one in 1825, and the other in 1837. The entire number of cases received into and treated in the lazaret, does not appear to have exceeded four or five; and the only instance of sickness among the attendants and employés of the quarantine establishment occurred in a man who had been put on board an infected vessel as health guardian.

munity of all the regular officers connected with the lazaret thus seems to show that there is little or nothing to be dreaded from the infection of plague, when patients are kept in clean, airy apartments. How different are the results, when the sick are compelled to remain in confined crowded places, as on board of a foul ship, for example! A vessel arrived at Zante, in June 1819, from Tunis, where the plague existed at the time of her sailing. There was no actual sickness on board when she arrived; but, as there was not a suitable lazaret ashore, she, with her crew of eight persons, was placed in strict quarantine in the harbour, having a health guardian on board to prevent all communication with the land. Within the next nine days, no fewer than seven of the crew, and the health officer, were attacked with a malignant fever, accompanied with bubos and carbuncles; every one of the cases terminated fatally. Only one of the unfortunate crew survived. Great credit was given at the time to the quarantine authorities that the fever did not spread to the shore!

I must not forget to mention that, among the many hundred men who have been employed during the present century in the lazarets of Malta and Marseilles (those of Genoa and other Italian ports may be added) in expurgating, as it is called, the bales of cotton and other articles of merchandize in vessels from Egypt and Turkey, there is not a single instance of one of them having ever been attacked. This, with a host of other most interesting facts respecting the true history of plague, was first made known in the Parliamentary bluebook on Quarantine, in 1843, and in the admirable Report of the French Academy published in 1845. Before the appearance of these important documents, the utmost ignorance prevailed. The experience of the French and Italian physicians, and of our own countryman, my late lamented friend, Dr. Laidlaw, who witnessed the severe

Egyptian epidemics of 1834 and 1837, has effected an entire revolution in medical opinion upon the subject, by proving the utter fallacy of the old idea, that it is chiefly, if not altogether, by direct contact with the sick or with *fomites*, *i.e.*, articles imagined to be infected, that the plague is liable to be communicated, while atmospheric contamination has nothing to do with the matter. Upon this most absurd belief, the machinery of quarantine regulations has been mainly planned. We now know that the plague, in respect of the circumstances which affect or favour its development and spread, is altogether similar to typhus in our own country. The same measures of prevention and repression are therefore required in both instances. Since the appearance of the French Report, the relations of the plague to quarantine have excited much attention in this and in foreign countries. The publication of the first Report of the General Board of Health, in 1849, gave fresh impulse to inquiry. Our distinguished corresponding member, Professor Sigmund of Vienna, has for many years past done excellent service to the cause of enlightenment and truth by his numerous writings. Dr. Sigmund's authority is the more important, from his personal knowledge of the pestilence in the Danubian provinces at different periods from 1828 to 1837, and his thorough acquaintance with the state of almost all the lazarets on the continent. The results of his observations during his mission to Turkey and Egypt, on which he was lately sent by the Austrian government, are contained in his very valuable work on Quarantine Reform published at Vienna in 1850. It is much to be regretted that our own Government has not followed the example set by France, Austria, and Russia—that of sending competent medical men to those countries where the plague is endemic, or which have been most frequently the scene of its visitations, to collect reliable information upon its history, and

to ascertain the actual results which have attended the quarantine and other precautionary measures hitherto resorted to in the cause of public health. Foreign countries charge us with saying much and doing little, except for our own immediate benefit and profit; and unhappily there seems to be too much ground for the charge. In a mere commercial view, no country is so deeply interested in the discovery of the truth and the right application of sound conclusions in practice, as our own.

I have next to consider the relations of quarantine to yellow fever. Various circumstances within the last few years,—more especially the case of H.M.S. *Eclair*, the recent publication of an Official Report on the disease by the General Board of Health, and the still more recent occurrences connected with the arrival of the West India mail steamers at Southampton—serve to give much interest, at the present time, to this part of my inquiry.

Fortunately, there is not any lack of evidence upon the subject; and although, as usual, there has been on most occasions no little discrepancy of statements, not to say of opinion as to the bearing of the statements, it will be easy to steer clear of controversy by appealing, almost exclusively, to the testimony of those writers, who have been the most zealous upholders of quarantine as a trustworthy defence against the invasion of the pestilence under consideration.

I select the visitations of Gibraltar, as affording perhaps the best means of testing the point. Since the beginning of the present century, Gibraltar has been five times the scene of epidemic attacks of yellow fever; viz:—in 1804, 1810, 1813, 1814, and 1828. These successive occasions present a singularly favourable opportunity for careful investigation; and as the 'Rock' is all but separated from the mainland of Spain—being connected with it only

by a narrow sandy isthmus which is easily watched—it may be regarded, for our purpose, as strictly insular, with every facility for complete isolation and rigorous quarantine. During the first three years of the century, yellow fever had prevailed in several towns on the southern shores of Spain, especially in Cadiz, Malaga, Alicant, and Carthagena. There was a recurrence of it in the following year.* In consequence of the great dread of the disease at Gibraltar (which had hitherto escaped), a most stringent quarantine had been perseveringly kept up against all arrivals from the neighbouring infected or suspected ports. Sir William Pym was then the quarantine officer of the harbour. In the month of July, he left his post on leave of absence, and did not return till the middle of October, when he found that yellow fever had fairly broken out in the town. The earliest suspicious cases had been observed about the beginning of September, in a notoriously filthy and unhealthy spot on the Rock; and to this spot the disease was for some time confined. The disease then rapidly spread, and eventually caused an immense loss of life. In less than three months, 6000 persons, out of a population, including the troops, not exceeding 16,000, perished. By the end of November, the pestilence had greatly abated; and it ceased entirely before the end of the year. As to the manner in which the pestilence has been alleged by some parties to have eluded the vigilance of the quarantine establishment, the following explanation is proposed by Sir William Pym,—not however, be it remarked, as the result of his own personal inquiries on the spot, but merely on the oral authority of one of

* It may be worthy of notice, as indicating a wide spread sickliness in distant parts of the world, that in 1804 the yellow fever was extremely prevalent in the West Indies, and caused very great mortality among our fleet, etc. Between seven and eight hundred died of it in the naval hospitals of Jamaica and Antigua alone, during this year.—Sir G. Blane's Observations.

the medical officers of the artillery, forming part of the garrison:

"A shopkeeper, named Santos (who resided in Boyd's Buildings), arrived from Cadiz on the 28th of August, 1804, and was taken ill on the 29th; he had lodged in a house at Cadiz, where some persons died of the then prevailing fever. Mrs. Fenton (wife to bombardier Fenton, of the Royal Artillery) was the second person attacked; she was taken ill on the 3rd of September. Her husband and a child of the name of Roland were taken ill on the 8th, and died on the 12th. Mrs. Boyd, who had visited Mrs. Fenton, was taken ill on the 13th, and died on the 19th; her husband was taken ill on the 14th, and died on the 16th. All those families were neighbours. The disease was confined for some time to this particular part of the town, and to those who had intercourse with them."

Such a loose unconnected statement as this can scarcely be received as evidence to prove anything beyond the alleged date of the first case, and the circumstance of the disease being limited for some time to the locality where it first appeared, and which is known to have been the most filthy and insalubrious on the 'Rock'. No intercommunication, it will be observed, between the first and second cases is even so much as mentioned; the connexion of the one with the other is merely guessed at. Unless medical evidence on so important a point of inquiry as that of the introduction of a pestilence be different from such a specimen as this, I fear that it will never command public confidence or respect.

Fortunately, there is another historian of this epidemic, Sir J. Fellowes, who was at Gibraltar during the greater part of its prevalence. Sir James, it is to be remembered, was a most zealous upholder of the contagion of yellow fever, and of the necessity of strict quarantine measures for its exclusion. His testimony is, therefore, the more valuable. Now, from his work, it clearly appears that there was no recognised or known yellow fever in Cadiz either at the time when the man Santos was there or when he left it; and moreover, it is certain that he obtained a passport from the British Consul there, before he went on board the vessel in which he took his passage for Gibraltar. The vessel too, it seems, remained quite free from sickness. All, therefore, that can be made out is simply that a man, arriving in apparently good health, at the usual sickly season—in a year, too, characterised by remarkable atmospheric distemperature—went to reside in a confined and crowded house in a notoriously filthy locality of a very unwholesome garrison town, and that, within a few days subsequently, he had an attack of fever from which he recovered; also, that other cases of fever occurred immediately afterwards in the immediate neighbourhood of the said locality.

It must not, moreover, be omitted to be mentioned that Sir James Fellowes had pretty strong grounds for believing that a fatal case of fever had occurred ten days before the man Santos' arrival, in the person of a smuggler from Malaga, who (if the authenticity of the case is to be admitted) must also have managed to have evaded the regulations of the port. Whatever view be taken, it is, at all events, quite obvious that the quarantine precautions failed in giving that security to the town which it was their object to impart.

Dr. Nooth, who acted as health officer of the harbour during the temporary absence of Sir Wm. Pym, as well as many other medical practitioners in Gibraltar at the time, and of the ships of war in the bay, were of opinion that the disease was of local development, and that foreign importation had nothing to do with it. It should always be borne in mind that there was not, perhaps, a more unwholesome garrison town in the British dominions than Gibraltar was

then, and continued to be for many years afterwards. The unnecessary sacrifice of life among the troops there, not to mention the civil population, during the first fifteen years of the present century, must have been enormous.

After the cessation of the severe visitation of 1804, the Rock remained free from the pestilence in an epidemic form for the next five years and a half, although occasional cases of the ordinary endemic fever of the place, accompanied with a dark yellow suffusion of the surface and sometimes also with black vomit, occurred in most years, even when the garrison was declared to be healthy. During the whole of this time, the Spanish ports, which had suffered so severely during the first four years of the century, were equally exempt. This cessation or lull in the course of pestilential visitations is a very suggestive and significant fact in epidemiology; and the fact is the more important as regards our present inquiry, as, during the very same period that the yellow fever disappeared from the southern shores of Spain, not only (as already mentioned) was epidemic plague absent from Egypt and Turkey, but there was also a very remarkable diminution of typhus fever in England at the same time. Whether there be any connexion between these coincident occurrences in distant countries, is a question of the utmost interest, but one as yet nearly quite unexplored.

In the summer of 1810, yellow fever re-appeared in most of the Spanish seaports which had been previously affected; nor did Gibraltar escape. The atmospheric peculiarities of the season were very similar to those which had been observed in 1804. Upon this occasion, it was believed that the disease was imported from Carthagena, as it was thought to have been on the former occasion from Cadiz. The facts related by Sir W. Pym, who was the quarantine officer of the port at the time, are these. Four transports, with de-

serters from the French army, arrived from Carthagena on the 19th of September. One man had already died from the fever on board one of the vessels, and there were several others seriously ill. The transports were anchored at least half a mile from the shore, and kept under the strictest quarantine. Sir W. Pym applied to the Governor to send them off to Minorca, as there was a lazaretto on shore there, and there was not one at Gibraltar. But this severe measure, very fortunately, could not be carried into effect. Sir W.'s narrative proceeds: "During the time that the disease had been going on on board the transports in the bay, the garrison continued in perfect health till the 20th of October, when, in consequence, as I must suppose, of a breach of quarantine regulations (which, however, could not be detected), a Minorcan family, in the south district, belonging to the dockyard, was attacked with the disease." A story was afterwards circulated, that some intercommunication had taken place between the person first attacked and the transports; but it could not be substantiated; and, as Sir W. Pym himself candidly admits that the pestilence found its way into Gibraltar through some undiscovered channel, while a most rigid quarantine was maintained all the while under his own directions, it is scarcely necessary to dwell any longer on the subject. Most of the medical practitioners on the Rock considered it to be of local and indigenous origin. It will be observed, too, that the fever again appeared about the same time of the year; and Sir W. Burnett, who was then principal medical officer of the Mediterranean fleet, mentions that, after very heavy rains in September, which had brought down a prodigious quantity of putrid decomposing matter from the upper parts of the town to the beach, the weather had set in very warm, with a prevalence of the oppressive easterly wind. Dr. Hennen states that, in the months of July and August,

bilious remittent fever was more than usually prevalent in the town, and that the type of the disease became more malignant and fatal in September.

It may not be undeserving of passing notice, that some of the physicians in Carthagena alleged that their epidemic in 1810 was brought to them from Gibraltar, while the quarantine authorities of the Rock attributed their visitation to their Spanish neighbours. This sort of mutual incrimination is far from being infrequent in the history of quarantine.

The next time that yellow fever broke out in Gibraltar was in September 1813—the year, it will be remembered, of the plague in Malta. This epidemic proved much more fatal than the preceding one. Sir W. Pym, who was still at the head of the quarantine department there, states that "it was again traced to importation"*—"that the individuals who brought the disease into the garrison were ascertained"—"that one of them was ill when he arrived"—"that the disease was communicated to the persons residing in the same house, and speedily on both sides of the street in which the house was situated". Unfortunately, he has omitted to give any particulars respecting these several allegations; nor does he state who were the parties that brought the disease, or whence they came, or when they arrived. We are necessitated, therefore, to look elsewhere for information as to the origin of this epidemic; and, happily, there is good evidence at hand. That most truthful writer, Dr. Hennen, who, when principal medical officer of the garrison, examined with great care all the official documents in the public archives touching the previous epidemics, states that cases of the disease had occurred a

* It deserves to be noticed that, in consequence of the known presence of the plague in Malta this year, the vigilance of the quarantine authorities at Gibraltar was even greater than usual.

couple of months prior to the date assigned to its appearance by Sir W. Pym. "One neighbourhood", he says, "viz., *Boyd's Buildings*, was, as usual, the theatre where the disease made its early appearance in the town; and, on the 6th of July, Mr. Frazer met with a case of highly suspicious fever, which proved rapidly fatal: there is little doubt that it was a genuine instance of that fever which afterwards committed such ravages." The accuracy of this important statement is verified by Sir W. Burnett and by Mr. Amiel; who, with all other writers on this epidemic, have alluded in the most emphatic manner to the notoriously unwholesome condition of the town of Gibraltar at the time, from the excessive crowding of the population, and the horribly filthy state of the lanes and houses, aggravated, as on former occasions, by the continued prevalence of easterly winds.

It is scarcely requisite to specify the stories that have been related by those who seem to imagine that, whenever a disease, which is only of occasional occurrence, appears in a place, it must necessarily have been introduced by some person or another, forgetting all the time that the atmosphere is the readiest vehicle of all. One of the rumours was, that the pestilence had been brought from Cadiz, by a vessel which arrived in the bay on the 11th of August: but, upon referring to Sir James Fellowes's history of the fever of that year in Cadiz, where he was the principal medical officer of the British garrison at the time, it appears that the earliest recognised cases there were not observed before the beginning of September. His words are: "Early in September, I heard that a suspicious case of fever had occurred in the well known *Barrio de Sta. Maria*"; the very locality in Cadiz where the disease first showed itself in 1800, and again in 1804. Sir James does not so much as even hint the idea that the disease had been this year imported into

Cadiz *ab extra*. Moreover, Mr. Frazer, who was at the head of the medical staff in Gibraltar at the time, candidly admitted, notwithstanding his decided opinion as to the contagiousness of the disease, that he had great doubts as to its importation in 1813.

It was upon the cessation of this epidemic, that the series of queries, which elicited so large an amount of valuable information respecting the sanitary state of Gibraltar, was addressed by the medical department of the army to the medical practitioners, civil as well as military, on the Rock.

In the following year, during the autumnal season, there was a fresh outbreak of the disease. It has never been alleged, as far as I know, that, upon this occasion, importation from abroad had any share in its development. The early cases appeared in the filthy, crowded localities, affected in former years.

After 1814, Gibraltar remained exempt from any epidemic visitation of yellow fever till 1828, a period of fourteen years; although sporadic cases, having all the characters of the true pestilence, occurred now and then in the autumn months. It was in 1828 that the plague prevailed in various parts of Greece, and in Wallachia, Moldavia, and other countries in the north of European Turkey. The Russian army, engaged at the time in war with the Turks, experienced disastrous losses from the ravages of the disease. At Gibraltar, the yellow fever appeared about the same season of the year as upon all the former visitations—a circumstance that is highly suggestive in an epidemiological point of view. The earliest cases occurred about the beginning of August. Dr. Hennen was the principal medical officer of the garrison at the time; he was also health officer of the port. Unfortunately for medical science, he fell a victim himself to the fever. He left, however, very ample notes respecting the circumstances

connected with its development; and his son, who edited the valuable work on the *Topography of the Mediterranean*, informs us that his father had quite satisfied himself that the disease could not be traced to importation. Sir Wm. Pym (who then occupied the post which he now fills) was sent out by the Colonial Secretary of the day, Sir George Murray, to examine into the history of the epidemic, at the head of a commission appointed for the purpose. He appears to have come to the same conclusion, if we may judge from the following statement in his book respecting the vessel which was at first suspected to have brought the pestilence from Havanna;—"I think it right", says Sir W., "to state, that there was no evidence to convict her, and that I stated my opinion generally that she ought not to have been under suspicion, as she underwent the regular period of quarantine, and was released therefrom in the regular way, with the approbation of the Inspector of Health in the quarantine department, and by the authority of the Lieutenant-Governor."

We have thus seen that, during little more than the first quarter of the present century, Gibraltar was five times the scene of epidemic yellow fever, notwithstanding the utmost vigilance of the quarantine department there, and the stringency, not to say severity, of the precautions taken to exclude the disease. That the most rigid measures were enforced, will be pretty manifest from the following particulars, related by Sir James Fellowes.

In Jan. 1811, two English transports, with between four and five hundred German recruits on board from Carthagena, were kept under quarantine for upwards of a month in the bay, without being allowed to communicate with the land. It does not appear that there was any actual disease on board; but they had come from a suspected port. They were then sent on to Cadiz, at that time in the possession of the English

army. On their arrival there, although the men were still free from sickness, they were not allowed to be landed at once; and as, unfortunately, the weather became very tempestuous, the soldiers were obliged to keep below in the between decks, most of the time. "When the weather moderated, every assistance was afforded them; but it proved that, during the few days that the hatches were covered over in consequence of the heavy rains, a complete typhus fever* had been formed; that the men (who appeared to be well while they had been kept on deck constantly, and the fresh air had been allowed to pass through the ship) were falling down with a malignant disorder, the germs of which, it was evident, had been brought by them from Carthagena, and had exploded into fever in the vitiated air by which they were surrounded in the close and crowded between decks."

There were upwards of one hundred already attacked. Prompt steps were at once taken by Sir J. Fellowes to separate the healthy from the sick. Four hundred, after due ablutions and change of dresses, were landed and sent to a temporary hospital, a mile from the town; while one transport was entirely evacuated, and after being thoroughly cleansed, ventilated, and fumigated, all the sick were removed into it. Eventually, all the sick were brought ashore. Due precautions were taken to prevent communication between the sick of the troops in the garrison and the inhabitants of the town; and although a good many deaths had taken place in the hospital, and more than two hundred in all had been attacked with this "highly contagious disorder", it at length ceased, without any detriment to the public health, either of the other shipping in the bay, or of the population on shore.

* From other statements in the narrative, it is obvious that the disease was genuine yellow fever.

From Gibraltar we now pass on for a few moments to the rocky island of Ascension, in the Atlantic Ocean, about seven or eight hundred miles from the coast of Africa. Its latitude is about 8° south of the equator, and its longitude is 14° 28' west. It is resorted to by shipping for refreshment and watering; but the island itself is entirely unproductive. Our ships of war upon the African station, when they have become sickly, often visit it. In 1823, soon after the arrival from Sierra Leone of the *Bann* frigate, which had lost many of her crew during the voyage, yellow fever broke out in the small garrison, and committed considerable ravages. As no quarantine restrictions had been adopted towards the ship, it has been generally believed that the disease on shore was directly introduced by the *Bann*. Sir William Burnett, who was sent out by the Admiralty to examine into the particulars of the case, and afterwards published an exceedingly interesting narrative on the subject, leaned to this view of the question; but he did not hesitate to avow, at the same time, that the evidence was not without some defective links. The circumstances were, however, so suspicious that, in future, ships arriving at Ascension with malignant African fever on board were directed to be detained for some time in quarantine, before having free communication with the garrison. Notwithstanding this precaution, there was a partial outbreak of the disease among them in 1838, several weeks after the arrival of the *Bonetta* in a sickly state from the African coast. The surgeon of the garrison regarded the distemper as of local origin; and Dr. Bryson, (in whose valuable work the particulars will be found), while he is of opinion that it was imported, nevertheless admits the impossibility of tracing the mode of its introduction, after all the pains he had taken to discover it.

The mention of the African station in connexion with

yellow fever and quarantine, naturally brings to our minds the sad case of the *Eclair* in 1845, in as far, at least, as its history bears upon our present subject. It will be remembered that, in consequence of the crew becoming very sickly at Sierra Leone, it was deemed advisable to leave the coast and go to Boa Vista, one of the Cape de Verde islands; and that, while there, her sick were landed upon a small islet in the harbour, but that the disease nevertheless continued to rage with great severity. The result was that after a short stay all were reembarked, and the *Eclair* proceeded on to England, where she arrived at the Motherbank, after a run of fifteen days from Boa Vista, on the 28th September. Already upwards of one half of the crew had perished since the commencement of the sickness in July, and every day added fresh victims to the list. It is needless to say that the utmost alarm and depression existed among all on board. The surviving medical officer urged the immediate landing of the crew, as the only means of arresting the terrible ravages of death; and Sir John Richardson, the physician of Haslar Hospital, expressed his readiness to receive them into the wards of that noble institution,—an advice that was cordially seconded by Sir William Burnett. Had this step been taken, much distress would have been spared, a heavy expense avoided, and, what is of far greater consequence, several valuable lives might have been saved. But, unhappily, the fears of our quarantine authorities prevailed over their judgment. The unfortunate remnant of the crew were doomed to rigid confinement within the walls of the pest-smitten ship; and this, too, in sight of the shores of their own country. After remaining three or four days in close quarantine at the Motherbank, the *Eclair* was ordered round to Stangate Creek, before either the sick or the unattacked were removed from her, but not till many fresh attacks and several deaths had occurred. She was not

released from quarantine till the end of October, or five weeks after her arrival in England. It is altogether painful to look back upon the sad history of this vessel. The serious errors that were committed with respect to the management of the sick at Boa Vista, were only outdone by those that were perpetrated after her arrival off our own coast. The case made a deep impression on the mind of the medical public; and it was hoped that a more judicious practice would in future be adopted by our quarantine authorities, in the event of a similar occurrence.

The proceedings which have recently taken place at Southampton, in reference to the mail steamers arriving from the West Indies, seem to indicate that the system to be pursued is essentially the same, although some of the details may be modified. It is, indeed, not easy to ascertain the principles upon which the course now adopted is based. The mail bags are landed *instanter*, while the passengers and crew are detained on board. Pratique is at once given, although men may be dying of the disease on board at the time, provided only their seizure took place six days (ten were at first deemed necessary) before arrival. A health officer goes on board an infected ship, and returns on shore himself, while he leaves the ship and all on board (the mail bags always excepted) in quarantine. At one time, not only the bedding of the sick, but everything which may have come in contact with them, is recommended to be burned; and then the corpses of persons, who have died on board of casual diseases, have been ordered to be taken out several miles to sea and buried there, before the vessel is permitted to come into port. Surely, such steps as these can serve but to spread alarm and bewilder the public mind, while they can give no real protection to the public health.* And be

* Besides the precautionary measures alluded to above, it has been stated in the public prints that an order was issued by the Admiralty, prohibiting

it remembered that, at the very moment when all this was going on towards the mail steamers at Southampton, the authorities at Port Royal, Jamaica, were receiving without delay or hesitation the sick from H.M.S. *Highflyer* into the naval hospital there;—that the wards of the public hospital at Kingston were open to the sick from the ships in the harbour;—and that, at Barbadoes, the suffering crew of H.M.S. *Dauntless* were at once landed and conveyed to the military hospital. With such facts before us, is it not high time that our quarantine system be looked into, with the view not only of bringing its regulations into harmony with the results of well attested experience, but also of establishing something like uniformity in its requirements?

It remains now to invite your attention to the relation between quarantine and the Asiatic cholera.

The whole history of this formidable pestilence is so interesting and instructive on all points of epidemiological inquiry, that it must ever occupy a very prominent place in every attempt to ascertain the laws which influence the development and diffusion of wide spreading diseases. No epidemic, moreover, has been so minutely and extensively observed, and of none have we such varied and thoroughly trustworthy records. We can trace its career almost step by step, and with something of the connected sequence of an historic narrative, from the time when it first—after having been for ages, for all that we know to the contrary, limited to one district of Asia, viz., Hindostan—began to assume the character of a great migratory pestilence, and go forth,

the reception on board of any of the West India mail steamers, on their homeward bound voyage, of yellow fever invalids, or of any distressed British subjects supposed to be labouring under, or recovering from, attacks of the disease. The cruelty of such an order is strongly commented on by Dr. Cummins, surgeon of the *Medway*, in the *Lancet* of May 28, 1859. If such an order has really been issued, it has not, I am assured by Sir William Burnett, proceeded from the Admiralty.

at the bidding of Almighty Power, upon its mission of warning and judgment to the ends of the earth. Its course and progress can be followed on the map as we follow the track of any of those hordes of the human race which, breaking loose from their place of long abode in some remote corner of the East, spread themselves of old over the face of the European continent. We can mark the advances of the invading foe from country to country; we can tell how long it was upon its successive marches; the dates of its arrival in different parts, the rapidity of its movements, the length of its stay, the places which it ravaged, and the very districts in each place upon which its chief fury fell. We know the means that were taken in every country that was invaded to avert the stroke, to keep the enemy out, or to resist its progress and mitigate its ravages; and we know, too, the amount of success or benefit which attended the efforts that were made. We know that the Russian government in 1831, having tried quarantine, and other like measures, to protect different parts of its dominions, speedily found their utter inefficacy, and abandoned all attempts of the sort; that the Austrian Emperor formally declared that his government "had committed an error in adopting the vexatious and worse than useless quarantine and cordon regulations against cholera", frankly admitting that it did so before the nature of the disease was rightly understood; that Prussia, too, having in vain tried the same expedients, was forced to give them up; that in our own country measures of the most extraordinary stringency to prevent the introduction, and to arrest the spread of the pestilence, were at first recommended and attempted to be carried out, and that they proved so utterly valueless that they were promptly discontinued, and the government of the day intimated, in the speech delivered from the throne, more than incredulity as to their use or expediency; that

the French Academy of Medicine formally declared their opinion to the same effect; and that transatlantic experience, both in the United States and in Canada in 1832, testified to a similar result. We know that, in the following year, the disease found its way into different ports of Spain, notwithstanding a rigorous quarantine; that, in 1834, it eluded the vigilance of the health officers at Gibraltar, as yellow fever had done in former years; also at Stockholm and other ports in Sweden, whose former immunity had been attributed to the stringent precautions of defence which had been taken; that, two years subsequently, Genoa, with its well appointed lazaretto and numerous quarantine staff, failed in its attempt at exclusion; and that Naples and Rome were equally forced to acknowledge the impotence of all their efforts. Nor was Malta more fortunate. Hitherto it had escaped, in consequence, many persons believed, of its insular position, and the strictness and efficiency of its quarantine establishment; and its exemption at a time when the pestilence was in Egypt on its one hand, and in Gibraltar and the south of Spain on its other, might certainly, with some show of reason, lead those, who form their opinions of epidemic diseases from the observation of what is going on in one or two limited localities, to this conclusion. But dismal experience now baffled the fond expectation, and proved the insecurity of the trusted means of defence.

Such were the lessons taught by the first world-wide migration of Asiatic cholera. After 1837, the pestilence ceased from the face of Europe for the next ten or eleven years—although scattered cases occurred every now and then in the various countries which had been affected, and a certain choleraic impress, so to speak, on the character of febrile and other diseases continued to be frequently observed.

The dark cloud once more appeared in the eastern horizon in 1845. Ere long, it became larger and more threatening, and steadily advanced in its march of destruction westward, following pretty nearly the track of its former career, and setting at defiance all mechanical attempts at exclusion where these were again attempted. Again did the quarantine authorities of this country issue some detentive regulations against vessels arriving from infected or suspected parts on the continent; but these, as you will probably all remember, were promptly abrogated, upon the recommendation of the General Board of Health, then recently instituted. The policy of this step was fully recognised by the London College of Physicians, whose well considered opinion stands in the following words:—"Cholera appears to have been very rarely communicated by personal intercourse; and all attempts to stay its progress by cordons or quarantine have failed. From these circumstances, the committee, without expressing any positive opinion with respect to its contagious or non-contagious nature, agree in drawing this practical conclusion, that in a district where cholera prevails, no appreciable increase of danger is incurred by ministering to persons affected with it, and no safety afforded to the community by the isolation of the sick." The Report of the Commissioners of Health in Ireland on the cholera epidemic of 1849-50 proclaims the same very important practical conclusions; and the medical authorities in Scotland have, I believe, emphatically recorded their opinions to a like effect. After such concurrence of judgment among the medical profession in this country, it is unnecessary to allude to that of our brethren abroad. It is all but unanimous; except, perhaps, in Spain and the Italian States, where other motives, besides those of truth and conviction, are well known to influence the judgment of officials upon such matters. Nor is it undeserving of notice that, although these countries profess to place the greatest reliance on

quarantine measures, and certainly carry them out with the greatest rigour, the experience of the recent epidemic has again shown their inefficacy against its invasion.* Malta, which, although a British island, may be regarded as truly Italian as regards her quarantine establishment, was again visited with cholera in 1850.

As far as I am aware, it has not been alleged by any person that it was then imported by shipping. Nor have the endeavours of the Spanish *guardas* to keep out the pestilence from Cuba, where the quarantine regulations are of the utmost stringency, been more successful. This was the only island in the West Indies that suffered during the first epidemic in 1834. In 1850, the enemy again found its way in by some channel that has never been discovered; and you will perhaps remember that, in the paper which I had the honour of reading before this society last year, I showed that the development of the pestilence in Jamaica towards the end of the same year could certainly not be traced to any neglect or violation of the quarantine, to whose agency the immunity of the island during the former epidemic had been ascribed.

Notwithstanding these facts, such is the dread of this plague in countries which have hitherto escaped its visitation, and such has hitherto, from long habit, been the vague and general belief that new diseases may be kept out by a system of rigorous medical police (just as interdicted articles of merchandise may be excluded by custom-house officers and coast guards, if these men will but do their duty), that the most extraordinary measures have been resorted to, in different places, within the last year or two for the purpose of presumed self defence. For example, two

* Professor Sigmund informs us that, in 1849, the disease made its appearance in Naples, Brindisi, Leghorn, and Genoa, in all of which places quarantine was maintained against its introduction; while Civita Vecchia, where no quarantine existed, escaped altogether.

years ago, at Demarara, a quarantine of forty days was imposed upon one of our ships of war, crowded with troops too at the time, simply on the ground that she had come from Kingston in Jamaica, although no disease existed in that town at the date of her departure, nor had a single case of sickness occurred on board during the voyage. This was, certainly, a precaution with a vengeance; and might, I need not say, have led to the most disastrous consequences to the unfortunate *detenus*, had not the captain wisely determined to go to another colony, where he might communicate with the shore, until the appointed time had expired for the landing of the troops at Demarara.

Something of the same sort recently occurred also at the island of Mauritius; so that you see what views are being still entertained, and acted upon too, by some of our own countrymen abroad. Let us not, therefore, boast too much of our superior enlightenment in matters such as that now under consideration, or be so prompt, as we are apt to be, to rail at the ignorant obstinacy and blind prejudices of foreign states, in refusing to go along with us in effecting the reform of various practices, however opposed these practices may be to the conclusions of scientific research and the acknowledged results of experience. Let it be remembered that the inconsistencies of our own Government have been often so flagrant, that foreigners may well call upon us to look at home, instead of setting ourselves up as their guides and instructors. They may remind us that, after two formal declarations of the inefficacy of quarantine to avert the cholera, an order was issued, no farther back than last September, from our Council office, reimposing what was called a "Quarantine of Observation" in our own harbours on vessels, on board which was "any person or persons actually suffering from cholera, or who had been suffering from that disease within the five days previous to

the arrival of the vessel in port";—such persons to be detained on board the vessel, and the vessel to be kept in quarantine "for such period as the medical officer employed to visit the sick might judge necessary for the security or preservation of the health of the community on shore."

In drawing these remarks to a close, I cannot but again strongly commend the subject of quarantine to the searching inquiry of the medical profession. That the system hitherto pursued stands in need of a thorough revision, and of some important changes, will not, I think, be questioned by any one. I have already occupied too much of the time of the society to dwell upon these points at present; and it is the less necessary to do so, as I have explained my views at some length in the Report on the Cholera in Jamaica and on the sanitary condition and wants of that island, addressed by me in the course of last year to the Colonial Minister.

T. RICHARDS, 37, GREAT QUEEN STREET.

BY THE SAME AUTHOR.

QUARANTINE AND THE PLAGUE.

"A very valuable pamphlet, giving an excellent *resumé* of the facts and arguments of the case."—*Dr. Bowring, House of Commons, March 18th*, 1847.

"They would beg to impress the whole bearings of the subject upon their lordships' attention; and among other documents of authority, they would recommend to their notice the Report of the Royal Academy of Medicine of France, with the facts as published by Dr. Milroy.—*First Report on Quarantine by the General Board of Health*, 1849.

THE CHOLERA NOT TO BE ARRESTED BY QUARANTINE.

"It contains an excellent concise history of the cholera epidemic."—*Dr Graves' Clinical Lectures.*

"A very excellent pamphlet on cholera."—*Dr. Bascome on Epidemic Pestilences.*

"An der wissenschaftlichen Verhandlung über die Pest und Quarantäne Frage hat sich vorzugsweise Dr. Gavin Milroy betheiligt, auf dessen pamphlets ('*Quarantine and the Plague*,' 1846, und '*Cholera not to be arrested by Quarantine*,' 1847) wir unsere Berufsgenossen recht sehr hinweisen."—*Die Quarantäne-Reform und die Pestfrage*, von Karl Ludgwig Sägmund. *Wien*, 1850.

QUARANTINE AS IT IS,

AND

AS IT OUGHT TO BE.

BY

GAVIN MILROY, M.D.,

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, ETC., ETC.

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1859.

QUARANTINE AS IT IS,

AND

AS IT OUGHT TO BE.

QUARANTINE is the enforced detention and isolation of ships and of everything on board them, persons as well as cargo, on arrival in a harbour, in consequence of the apprehended importation thereby of a disease deemed liable to spread and to become pestilential.

There is also a Quarantine by land, which consists in trying to isolate a place where the disease already exists, by encircling it with a cordon of troops, to bar all intercourse between the infected locality and the adjacent districts, in the hope of preventing the extension of the mischief, and extinguishing it on the spot where it exists.

The duration of Quarantine is made to vary according to the believed presence or absence of the apprehended disease in the port from which the vessel sailed, or at which she last touched, the health of the crew and passengers during the voyage and on her arrival, the description of her cargo, and the circumstance of there having been any communication or not with other ships, persons, or things on the high seas or elsewhere.

If the port of departure be entirely free from the disease, the vessel receives a clean bill of health (*patente nette*); if otherwise, a foul bill (*patente brute*), the effect of which is, that a more or less lengthened Quarantine will be imposed on her in the port of arrival, although all on board may have remained in perfect health during a voyage of many days, or even weeks, and although there be no trace whatever of any sickness when she arrives. There is, moreover, what is called a 'suspected' bill of health (*patente touchée*), given to vessels coming from places which, although quite healthy themselves, continue to hold communication with countries where the apprehended disease may exist, without adopting the customary and traditional stringent measures against these countries. The quarantine required for suspected bills of health is intermediate in duration and strictness between what is imposed in the other two cases; for it is to be kept in

mind, that even a clean bill of health does not always ensure immediate 'pratique,' or free communication with the shore upon the ship's arrival.

Some articles of merchandise are considered to be susceptible, *i.e.*, capable of attracting and becoming impregnated with the morbific miasm floating in the atmosphere of an infected locality, and of conveying this poisonous matter from place to place. Other goods are supposed to possess this property only feebly and imperfectly; while a few are said not to have it at all, and to be *unsusceptible*. These distinctions are for the most part purely imaginary.

The visit of a Quarantine officer to a ship on arrival is rather for the purpose of obtaining answers to certain prescribed questions respecting the voyage, &c., than of ascertaining the actual condition of the vessel itself and of the persons and things on board, as far as sickness, or liability to cause sickness, is concerned. He merely goes alongside in a boat, puts certain queries to the captain, writes down the answers on a sheet of paper, and passes this to the captain for signature. The signed paper and the ship's bill of health, having (in the event of any suspicion) been first sprinkled with vinegar, or duly fumigated, are received back into a basket, or with a pair of metal tongs, by the health-officer, who returns on shore either to make out a warrant of release or to prescribe the necessary Quarantine.

Should any one be sick when the ship arrives, and there be no medical man on board, the Quarantine officer prescribes as he best may, without seeing the patient. If he went on board, he must remain there, and could not return on shore. The case is the same even when the sick or suspected are removed to a lazaret. The health officer can attend upon them only under certain appointed precautions; otherwise, he could not leave the lazaret himself without incurring the risk of conveying the pestiferous poison abroad!

The theory and the whole machinery of Quarantine rest on the belief, not only that certain diseases are communicable from the sick to the healthy under all circumstances and conditions, and are capable of spreading in this manner with epidemic force in a new and distant locality; but also that the miasms of these diseases, floating in the atmosphere of infected places, are liable to cling to the surface of persons and inanimate objects, and may thus be conveyed in shipping to great distances, and after long intervals of time, retaining all the while the power of infecting the atmosphere in the port of arrival.

It is also presumed that the morbific germs may be incubant or lying dormant in the systems of persons who, although perfectly well on arrival, may sicken afterwards, and then become the radiating centres of a wide-spreading infection.

That certain zymotic diseases are more or less actively infectious—*i.e.*, communicable from the sick to the well through the medium of the atmosphere—is not to be gainsaid.

In one group of these diseases, as in small-pox, scarlatina and measles, the infectious property seems to be *inherent* and *essential*. This may, indeed, at times be feeble and unenergetic; still, it is always

present, and may, from some unforeseen cause, suddenly acquire great potency.

Moreover, no ordinary sanitary precautions that we know of can prevent either the development, the extension, or the recurrence of the exanthematous or eruptive fevers, however much these precautions will very generally serve to abate their severity and fatality. Occasionally, though rarely, small-pox and scarlatina are as fatally malignant in the clean and airy abodes of the rich as in the dwellings of the poor. The temperament and constitution of the persons attacked have much to do with the severity of the seizure.

There is another group of zymotic diseases in which the infectious property is not inherent and essential, as in the former, but is only *conditional* and *contingent*, *i.e.*, depending upon, and requiring for its manifestation, the coexistence of an artificially polluted atmosphere. Typhus fever is an example of this class. No disease has a more terrible power of self-propagation and increase when the sick are crowded together in impure, ill-ventilated chambers. In clean and spacious apartments, however, where the atmosphere is being continually renewed by the due admission of fresh air and the simultaneous escape of the vitiated air, all risk of the extension of the infection ceases. The means of arresting the evil are thus in our own power, and are, moreover, always at hand.

In this respect, therefore, there is a marked difference between the infection of typhus, and that of such diseases as small-pox and scarlatina. Unlike, too, to the true exanthematous or eruptive fevers, typhus seldom or never springs up *de novo* without the concurrence of local noxious agencies which it is easy to prevent and remove, and the very existence of which is proof positive of neglected sanitary regulations.

Now, what is true of typhus is equally applicable to the oriental *plague*, as respects its mode of development and extension. The experience of the last five-and-twenty years has established this as a fact beyond any reasonable doubt. The plague is apt to spring up in the filthy towns and villages of Turkey and Egypt, under the very same conditions as typhus does in our foul lanes and alleys; and when it spreads, its spreading is due to the like influences of artificial local contamination. It was therefore no vain or unmeaning boast of the late Mehemet Ali, when, alluding to the many works of improvement he had carried out and intended to carry out in Egypt, he said, 'We must get rid of the plague.' He knew that it might be done.

In all prophylactic and preventive measures, therefore, directed against the plague, we have but to consider what experience has shown to be necessary against typhus; neither more nor less being required. The Quarantine restrictions and regulations against the former disease should be exactly those which it is found right and necessary to be adopted against the latter disease.

But what have recent occurrences in the Mediterranean shown to be the practice still pursued by almost all the European States in reference to this matter?

In the early part of the present year, a bad form of fever broke out in a filthy Arab village near the town of Bengazi, on the Barbary coast, and continued to spread slowly for weeks and months without exciting much alarm in the district. During all this time, it was not regarded or called the plague. This has always been the case with epidemics of this pestilence. No one pretends to be able to distinguish the disease at first from other bad forms of fever. And so it was at Bengazi. It was only when buboes and carbuncles were superadded to the other symptoms, that the fever was recognised and designated as the plague; and then only did quarantine measures begin to be enforced in the Mediterranean ports against the infected place. Before that, no special precautions had been taken or deemed necessary against arrivals from the Barbary coast. But no sooner was the dreaded name of plague affixed to the disease, (which, as we have seen, had been existing for months before its real nature was discovered,) than the entire machinery of quarantine, with all its strange and most extravagant complications, was set in motion by most of the European States to prevent the importation of the pestilence among their subjects.

One or two examples will suffice to show the nature of some of the precautions.

A quarantine of twenty-one days' duration was imposed in the ports of Naples, Greece, Portugal, &c., upon all vessels coming from or which had touched at Gibraltar; not that any disease existed there or that the health of the Rock was bad at the time, but merely because it continued to hold communication with Morocco, which was also at the time in a healthy state and quite free from any pestilential malady. Our Government, as well as that of France, held out for some time against such preposterous proceedings, and counselled a rational moderation in the enforcement of precautionary measures; but the attempt only brought down upon our intercourse and commerce retaliatory prohibitions of the utmost stringency, and our Mediterranean ports were compelled to yield.

One of the Peninsular and Oriental steamers on her voyage out from this country to Alexandria had to land some passengers at Gibraltar. Before leaving the harbour there, it was necessary to have a bill of health of the place. The document was duly sent on board, enclosed in a tarred box carefully fastened down. The captain of the steamer, not aware of the risk he and his ship incurred, inadvertently opened the box to look at the paper. On arrival at Malta, it was declared by the authorities there that, in consequence of this act, the steamer must be regarded as having had communication with a suspected port, and must undergo a quarantine of ten days. The passengers who landed were detained in the lazaret for that period, before they received pratique!

At Alexandria, a curious event occurred. A vessel with 250 pilgrims crowded on board arrived in that port from Tunis. During the voyage, one of the pilgrims—who, it is scarcely necessary to say, are always abominably filthy in their persons and habits—sickened

of a fever and died. After some controversy as to the true nature of the case among the health officers of Alexandria, it was decided that it should be regarded as one of plague, and the most stringent precautionary measures were accordingly enforced against the ship and all on board, to prevent the spreading of the disease to the town. The pilgrims were crowded together into the lazaret, and kept under strict guard. While thus confined, another man fell sick of fever and died. Again was there difference of opinion among the medical attendants as to whether it was a case of genuine plague, or not; but the majority decided in the affirmative. One of these gentlemen, in examining the case, had touched the patient's body, and had returned home without having undergone the prescribed purification. When this came to be known to the foreign consuls, they at once communicated the intelligence to their governments, and the result was that Alexandria was forthwith declared to be infected or suspected of having the plague, and treated accordingly.

Comment upon such proceedings as the above is unnecessary; they outrage common sense, and disgrace the medical profession at whose door lies all the folly of 'quarantine as it is.'

The subsidence and all but cessation of the plague during the last twenty years in the Turkish dominions has been attributed by many to the institution of quarantine, or rather a system of sanitary police, by the Porte in 1838-39. And doubtless the measures which have been carried out in Turkey, Syria, and Egypt since that period, must have been productive of no small amount of good in arresting and extinguishing the disease, and preventing its unchecked propagation. Wherever a real or suspected case of the disease occurred, the infected house was immediately emptied of all its inmates, and underwent a thorough cleansing and purification. Infected or suspected shipping was likewise subjected to quarantine detention, and not permitted, as had previously been the case, to enter harbours at once and communicate immediately with the shore without let or hindrance.

After the great fire of London in 1666, which swept away so much of the worst-conditioned parts of the city, and resulted in a general improvement in the dwellings, streets, &c., the plague, which was then seldom absent in its sporadic form, and had three or four times raged with epidemic violence since the beginning of the century, became greatly less frequent, and ere long ceased to be ever met with in the metropolis; and this, too, before any system of quarantine had been established in our country.

I shall now briefly notice another pestilence against which quarantine is in the present day specially directed—viz., *yellow fever*.

The experience of the last nine or ten years has afforded an unusually wide field for the observation of this disease, and it has been studied with much greater exactitude than before. Its appearance for the first time (as far as accurate records go) as a great epidemic in the Brazils in 1849-50, and its gradual extension northwards and southwards to the latitude of New York on the one hand and that of Buenos Ayres on the other, and from east to west right across the

South American Continent, as well as its persistence from that date down to the present time in some part or other of this wide extent, are events full of instruction and warning.

Now, no one fact has been more indisputably made out than that yellow fever never manifests any tendency to spread from the sick to the well in pure and airy chambers, more especially when the patient has been removed from the place where he caught the disease. The medical and other attendants run no risk whatever under such circumstances.

To deny the communicability of yellow fever absolutely and unqualifiedly is unwise, because it is against evidence. In the ill-ventilated between-decks of a ship, and in like conditioned abodes on shore, it has unquestionably spread by infection. The potency or activity of the infectiousness of yellow fever is, however, never so great as that of the plague or of typhus; it is more easily dissipated and annulled.

As in the case of the plague, mild cases of yellow fever are not distinguishable from the ordinary endemic fevers of the country, which are not regarded as at all infectious, and against which there is no quarantine. Such cases usually usher in an epidemic. It is only when its malignancy is fairly established that quarantine comes into force. The gates of the citadel are closed after the foe has got in.

Certain it is that quarantine, as hitherto practised, has signally failed in keeping out yellow fever from countries exposed to its invasion. Instances upon instances might be quoted: I shall mention but one, the most recent and one of the most striking of all; viz., that of Lisbon last year. Notwithstanding the unceasing maintenance of a most vigilant and stringent quarantine at every point of her coast, and against every part of the world which was or could be suspected—to the immense inconvenience of all intercourse and serious detriment to commerce—the enemy found its way into that notoriously foul and unwholesome city, and caused such a panic by its destructive ravages, that for a time all business was suspended, the law courts were closed, and the legislature refused to hold its sittings.

Portugal was the only country in Europe visited by the pestilence, although others, our own among the number, had much ampler and more frequent intercourse with Brazil, from which the Lisbon Board of Health contended that the disease had been imported.

The mild precautionary measures adopted of late years at Southampton, towards vessels arriving there with cases of yellow fever recently or actually on board, have been found quite sufficient in protecting the public health.

Epidemic Cholera is another disease for which quarantine continues to be imposed in many countries.

It was expected by the medical profession and the educated public in this country, as well as in France and the United States, that after the experience of the two visitations in 1831-2 and in 1848-9, the universally ascertained inefficacy of ordinary quarantine to keep

out the pestilence—for not a country or land escaped—would have been everywhere acknowledged and acted upon in the future. Not so, however; for on no former occasion was the system more rigorously followed out than it was in the last visitation in 1853-4 by Spain, Portugal, Naples, Greece, and Sweden.

For example, on the earliest intimation of cholera having appeared in this country, Spain immediately required that Gibraltar should at once impose a strict quarantine upon all arrivals from our shores, whether the ships were healthy or not. The governor of the garrison hesitated to accede to the demand; and straightway an embargo was placed by the Spanish authorities on all direct communication between their country and the Rock, to the great inconvenience and distress of the inhabitants of both, more especially of the latter, which derived its chief supplies of food from the surrounding district. Smuggling of course went on, however, actively all the while. After lengthened remonstrances and counter-remonstrances, Gibraltar was compelled by force of circumstances to yield. Ere long, the exigencies of war broke through all quarantine restraints both there and in other ports in the Mediterranean; and during the greater part of 1854, when the cholera was at its height both in our own country and in France, an unobstructed intercourse was continually going on with Gibraltar and Malta, and between those places and every part of the Mediterranean, the Bosphorus, and the Black Sea. Now, it is a very notable fact that during the whole of the Russian war, cholera never spread either at Gibraltar or Malta, nor yet at Balaklava or at Kamiesch, although vessels were continually arriving and landing the sick at all those places, and the only precautions that were adopted were the prompt removal from shipboard of every person that could be sent on shore, and the locating them in healthy situations. No experiment could be more conclusive or ought to be more instructive.

While such was the course pursued, and such were the results, in English and French ports, the most rigorous quarantine continued to be exercised by other countries. The steamer, in which I was a passenger in the summer of 1855 from Marseilles to Constantinople, took on board at Malta a French soldier who, while affected with diarrhœa, had most imprudently bathed in the sea just before coming off to the vessel. The symptoms rapidly became worse, and he died collapsed next morning. The body was immediately committed to the deep. On reaching the Greek island of Syra, the steamer was declared to be infected, although there was not the slightest trace of sickness among any on board, and kept during her stay in strict quarantine, and the passengers, who had to be landed, were sent off for ten days to a lone island seven or eight miles distant!

Notwithstanding the utmost vigilance of the Spanish and Portuguese authorities at the same time, the pestilence found its way into both of these countries, and spread from town to town and from district to district, committing terrible ravages everywhere, and especially in seaport towns, which are always the most unwholesome and worst conditioned. No city has of late fared worse than Lisbon has done. In

1856, the cholera, and in 1857-8 the yellow fever, swept away thousands of her people. Nowhere is quarantine more vigilant and more strict.

I have thus briefly noticed the three diseases—plague, yellow fever, and cholera, against which quarantine is at present chiefly directed. Admitting that infection, or communicability from the sick to the well, is an element or factor in the propagation of each and all of them —although in the case of cholera the property is comparatively very feeble—I have sought to show that it requires for its active manifestation the co-existence and co-operation of a polluted atmosphere, and that all that is needed for its effectual dissipation is the correction or removal of this artificial adjunct. The ready means of extinguishing the mischief are thus always in our own hands. Let not, therefore, in considering the subject of quarantine, the mere abstract technical question, 'Does this or that disease ever manifest an infectious property?' be uppermost in the mind and guide our decision; but rather such practical questions as these,—'What part does infection play in their general dissemination?'—'Is the part a principal or merely a subordinate one?' and 'Is the infection constant and inherent, or is it only conditional and, therefore, avoidable?' This simple rule will save the inquirer from many errors, and lead him into the right way.

'Quarantine as it ought to be,' should, in my opinion, be as follows:—

1. The enforced detention and isolation of shipping are necessary only when disease actually exists on board, and when the vessel is in a foul and infected condition upon arrival.

The health-officer should go at once on board, and personally inspect the state both of the ship and of all on board, before determining the restrictions to be imposed.

An accurate registry of every inspection should be kept.

2. The sick, and all persons in whom the early or precursory symptoms of sickness are present, should be removed as promptly as possible, from the ship to clean and airy rooms on shore, or to a floating hospital moored in a healthy situation. The detention of such persons in an infected ship is obviously most objectionable.

3. There being no reliable evidence that any pestilence was ever introduced into a community by persons who had been quite healthy during a voyage, and were so upon arrival, it is unnecessary to detain such persons in a lazaret upon the mere speculative apprehension that the disease may be dormant in their systems.

Emigrants and pilgrims, being often extremely filthy in their persons and clothing, should be subjected to special examination and purification before they are permitted to go free upon landing. A supervision of the dwellings to which such passengers usually resort should also be maintained.

4. The experience of all lazarets having shown that the fears of a pestilential disease being introduced by the ordinary cargoes of dry and imperishable goods are groundless, the tedious and expensive restrictions often imposed upon such cargoes may be discontinued without any risk.

Such articles as foul rags, putrid hides, rotten meat and vegetables, guano, &c., should be landed under special regulations, and apart from ordinary wharves and from dwellings.

Foul bed and body linen and other baggage of the sort should not be landed when there has been sickness on board, or where any epidemic exists on shore, without previous thorough cleansing and disinfection.

5. Vessels in a filthy, unwholesome state from foul bilges or otherwise should not be allowed, whether there has been sickness on board or not, at once to enter a crowded port, or to lie alongside a wharf or other ships; nor should they be permitted to land their cargoes until they have been duly cleansed out and ventilated.

A foul ship is much more to be dreaded as a vehicle of introducing disease than anything she has on board; and no small risk is often incurred by pilots, custom-house officers, and other persons who go and remain on board. The atmosphere in the hold and the between-decks of such a vessel will often poison a stranger fresh from the shore, when the crew have escaped.

If disease has been on board during the voyage or on arrival, the ship should be limewashed and fumigated, as well as cleaned out and aired, before free entrance is granted.

6. One of the most important duties of a quarantine health-officer should be to maintain a vigilant supervision over the sanitary state of ships in port and on arrival.

If bills of health were made to certify the condition of a ship, and of her accommodation for the crew and passengers, as well as the mere existence or non-existence of disease in the port of departure, a far more effectual protection against the introduction of disease into the port of arrival would be afforded than now exists.

A *clean bill of health* would then have a significant meaning, and the services of the health-officer would be of great value to the community.

The machinery of quarantine might thus be made instrumental in the general sanitary improvement of mercantile shipping, a subject which calls for much more public attention in every country than it has yet received. There is a large amount of impaired and damaged health, as well as of actual disabling sickness and of death, among the crews of our merchantmen, arising from causes on board ship which might be easily prevented.

7. As to the quarantine measure on land of encircling an infected spot with a cordon of troops or police in the hope of preventing the extension of any pestilence, humanity as well as experience denounce it as utterly unjustifiable. It is alike barbarous and homicidal.

Such is the system of quarantine which I should propose. If asked what hope is there of so simple a system being ever adopted generally, and in foreign countries as well as in our own country and colonies, I must admit that the attempts hitherto made to reform the existing quarantine have been anything but encouraging. Missions and commissions, and international conferences have been tried and failed, and diplomatic remonstrances have not been more successful.

No one nation can well act in the matter quite independently and without the concurrence of other countries. England and France and the United States would willingly adopt a more rational procedure, but they are checked (as recently in the plague on the Barbary coast) by other governments refusing to go along with them, and threatening their intercourse with oppressive restrictions.

One way only is left, and probably it is the best, after all—viz., to enlighten general opinion everywhere, by keeping before the public eye the fallacies and evils of the existing system, and at the same time the simple and effectual means of reform.

A good mode of doing this would be by the annual publication of a digested report of all proceedings touching quarantine, not only in our own ports at home, but also in our different colonies, as well as in all foreign countries, in as far as they have affected in the course of the year our commerce and intercourse. A large amount of information on the subject is continually being sent to the Foreign and Colonial Offices, and also to the Board of Trade and Privy Council. Hitherto, this information has been only occasionally and at uncertain and often distant intervals made public, and then generally in a bulky blue-book. Let but an annual digest of each year's proceedings be prepared in the Privy Council Office, and, as with the reports of other governmental departments, be regularly laid before Parliament; and ere long public attention will be drawn to the subject, first in our own country, next in our colonies, (in many of which the utmost ignorance and error prevail,) and eventually even in those continental nations that have hitherto resisted every attempt at change, and cleave to a system which, in most of its details, outrages common sense and is a scandal to medical science.

The appointment of a Special Committee by the Association to examine into the whole subject of quarantine, and to report the results of their inquiries at the next annual meeting, might, I think, be also productive of much good to the cause of enlightenment and truth.*

* A resolution to this effect was adopted by the Public Health Section, and afterwards confirmed by the Council of the Association.

The Committee appointed consists of the Superintendent-General of Quarantine, the Directors-General of the Army and of the Navy Medical Departments,—Sir James Clark, Bart., Professor Owen, Drs. Southwood Smith, J. Davy, Babington, Farr, M'William, Bryson, and Milroy; and Messrs. Ronald Martin, Spencer Wells, and Wiblin.—London, March, 1859.

THE INTERNATIONAL QUARANTINE CONFERENCE OF PARIS IN 1851–2,

WITH REMARKS.*

By GAVIN MILROY, M.D.,
FELLOW ROYAL COLLEGE PHYSICIANS, ETC.

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In 1850, upon the invitation of the French Republican Government, it was agreed among the different States which had coast possessions in, or close to, the Mediterranean, that an international Conference on the subject of quarantine be held in Paris.

Delegates, medical and consular, attended from France, Great Britain, Austria, Russia, Sardinia, Tuscany, the Papal States, Naples, Turkey, Greece, Spain, and Portugal.†

The omission from such an inquiry of the United States, which could have afforded the most valuable information on some leading points, was, I think, much to be regretted.

* A Report of the proceedings of the Sub-committee, that was appointed by the Council on February 23, 1859, for the consideration of the whole subject of quarantine, was read by Dr. Milroy, secretary of the sub-committee, at the same time as this paper, which was prepared at the suggestion of some of the members. The sub-committee had framed a series of queries, embracing the various topics requiring elucidation, and on which authentic data were most desirable. These queries had, on the application of the Earl of Shaftesbury, then President of the Public Health section of the Association, been submitted to the Foreign and Colonial Secretaries of State, and by these ministers sent to all British consuls abroad, and to the governors of all our colonies. The Directors-General of the Army and Navy Medical Departments had also transmitted them to the principal medical officers of both services on all foreign stations.

From these channels a large amount of most valuable information had been obtained, more than ninety replies having been received at the date of the meeting at Bradford. Upwards of forty more have since been received (Dec. 31).

A local committee has been formed at Constantinople, through the instrumentality of Dr. Foote, an able resident physician there, for the investigation of the quarantine practice in the Turkish dominions. Some highly interesting details have already been received in a preliminary report from this gentleman.

The sub-committee expect to have their full report ready at the next annual meeting of the Association.

† The *Consular* delegates were M. David, Sir A. Ferrier, MM. Lavison, Ebeling, Magnetto, Cecconi, Escalon, Falcon, Halphen, Vitalis, Segovia, and Silveira; and the *medical* delegates were Drs. Mellor, Sutherland, Menis, Rosenberger, Bo, Betti, Cappello, Carbonaro, Barteletti, Costi, Monlau, and Grando.

The first meeting was held on the 23rd of July, under the Presidency of M. David, a Minister Plenipotentiary of France; and the subsequent meetings, forty-two in number, took place during the next six months. The Conference finally closed on the 19th January, 1852, receiving the thanks of the Prince President, then just elevated to permanent supreme power.

At one of their earliest sittings it was decided that only two kinds or degrees of quarantine be henceforth recognised—viz., 'quarantine of observation,' and 'quarantine of rigour or strictness,' and that the third or intermediate kind, 'suspected quarantine,' should be discontinued.

Quarantine of observation involves only the enforced detention and isolation of a vessel with all persons and things on board for a specified time, due attention to ventilation and cleanliness being required to be observed. In strict quarantine, besides a longer detention and a more rigorous isolation, other special precautionary measures, including the disembarkation of persons and the cargo in a lazaret, and their presumed disinfection by fumigation, &c., are imposed.

It was also resolved that, in future, only two forms of bills of health should be used—the clean and the foul—according as certain diseases, to be presently mentioned, are ascertained and certified by proper local authorities (and not merely rumoured or conjectured as had often been the case hitherto) to exist in the port of departure.

The intermediate form, the suspected bill of health, was declared to be unnecessary.

Moreover, it was agreed that, in all cases of quarantine without exception, the quarantine measures shall apply equally to the vessel, to the crew and passengers, and to the cargo, whatever be their condition as to health and soundness, or otherwise, during the voyage or on arrival.

It must always be borne in mind that the imposal of quarantine by no means implies that there has ever been any, even the slightest trace or suspicion of, sickness on board the ship which is detained. In the large majority of instances, the vessel and all on board have been and are quite healthy and sound; but the port from which she sailed being declared to be infected, all arrivals therefrom are presumed to be liable to convey and transmit some portion of the local infection. The quarantine is directed against the 'pays de provenance' generally, and it therefore involves all persons and things coming therefrom, without reference to their actual and ascertainable condition.

The first question of real importance which the delegates had to settle was, to agree among themselves what are the diseases against which this general quarantine should be declared to be necessary. After much learned discussion, it was resolved that the three diseases of the plague, yellow fever, and malignant cholera shall be held as, in an especial manner, demanding the use of quarantine measures for the protection of a country against their introduction from abroad.

This decision of the Conference was not adopted without much opposition, more particularly as regards the *cholera*. Austria protested against the necessity for general quarantine against this disease. She had given a fair trial to it in 1831, and had found it not only useless, but disastrously mischievous; and the subsequent experience of other countries had confirmed the opinion she had formed on the subject.

Besides England, France and also Sardinia expressed their opposition to the measure. They had indeed continued a modified and mitigated sue of it in some of their ports, but only out of deference to other States in the Mediterranean, and until some general agreement on the subject could be come to.

On the other hand, Naples and the Papal States resolutely maintained the necessity for as strict quarantine against the cholera as against the plague, and expressed their determination to resist any attempt to do away with it. The Island of Elba and many places in Italy, they said, had been preserved from the pestilence by the adoption of strict segregation and the exclusion of all suspected arrivals; and other places might enjoy the same immunity by like measures, if promptly and energetically used.

The delegates from Spain and Portugal, while admitting that it is mainly by carrying out sanitary measures on board merchant vessels, and also in all sea and river ports which are very generally noted for their extreme unhealthiness, that the spread of cholera can be checked, contended that, until such measures have been universally and efficiently carried out, quarantine must be continued.

The Russian delegates stated that, in consequence of the unsuccess of the practice throughout Russia during the first epidemic in 1830-1, no regular quarantine measures were anywhere adopted on the second visitation in 1847. The epidemic of that and the following year proved, however, to be more widely spread and more fatal than on the former occasion; and as their Government had been informed that the conterminous countries of Sweden and Silosia had recently (1850-1) been preserved from the pestilence by the adoption of energetic restrictive precautions, Russia had not come to a definite decision on the question, but awaited the results of further trial and observation.

On two points, however, experience, they said, appeared to be conclusive, viz., that the disease, when occurring only in sporadic and occasional cases, is certainly not importable by intercourse; and, secondly, that the only *fomites* or articles capable of transmitting the cholera poison are bed or body clothes fouled with the excreta of the sick.

The final decision of the Conference, as carried by a majority of votes, was that all arrivals whatever from a place where cholera exists should be liable to a quarantine of observation of five complete days, the voyage being included in this period, before free pratique is granted.

If a case of the disease occurred during the voyage, the quarantine to date from the arrival of the vessel; and, if during the performance of quarantine, a fresh detention to be imposed from the date of each such occurrence.

With respect to cargoes generally, it was decided that they shall

never be required to be disembarked into a lazaret, or be subjected to any other measures of purification, except free ventilation on board, and due attention to the cleanliness of the vessel itself.

These remarks apply to arrivals from countries actually infected with the cholera. A shorter quarantine of observation, namely, for three days only including the voyage, might be imposed on arrivals from countries which a local board of health should consider to be compromised, either by proximity to an infected place or otherwise, although the disease may not yet have manifested itself.

Yellow Fever.—The quarantines against this disease are made much more severe than for the cholera. A 'minimum' and a 'maximum' period of detention are appointed, according to the length of the voyage, the occurrence or not of suspicious sickness during the voyage, and other circumstances to be determined by the authorities in the port of arrival.

The minimum period shall be from five to seven days, the maximum from seven to fifteen days.

Should the voyage have exceeded thirty days, and have been quite free from sickness, and should the vessel be found to be in a good sanitary condition on arrival, the detention may be reduced to three days.

With respect to the treatment of the cargo, simple aeration on board may suffice if the voyage has exceeded ten days, and no sickness whatever has occurred since leaving the port of departure. But when any case of the disease has occurred on board, or if the voyage has been shorter than ten days, a local board of health may require, if it sees fit, the same strict precautionary measures, viz., disembarkation and disinfection in a lazaret, to be adopted as in the case of the plague.

As numerous instances had come to the knowledge of the Conference where long and expensive detentions had been imposed on the score of the yellow fever, and where it was afterwards discovered that no disease of the sort existed in the place at the time of the vessel's leaving it, it was decided by a majority of votes that the actual and ascertained existence of the fever in the port of departure should, in future, be duly certified by the local authorities, to warrant the issuing of foul bills of health. The delegates from Spain, Naples, and the Roman States, nevertheless, strongly resisted this decision—on what reasonable grounds it is not easy to imagine.

With the exception of M. David, who had resided for many years as French consul in the West Indies and America, none of the delegates seem to have had any practical acquaintance with the yellow fever in its native localities. As usual in such circumstances, their views were derived rather from individual and detached statements of others than from the sifted results of comprehensive observation. Several of the assertions made by the Spanish and Portuguese delegates were obviously incorrect.

The Plague.—Against this, the most dreaded because the least known, of pestilential diseases, quarantine has hitherto been directed

with especial rigour, and in this spirit the decisions of the Conference were framed.

As in the case of the yellow fever, a minimum and a maximum period of detention was imposed on all vessels, whether sick or well, coming from an infected or suspected port;—the former to be of ten days, and the latter of fifteen days' duration.

An extra and special precaution was to apply to vessels arriving from any port in the Ottoman dominions, viz., of requiring that even when they brought clean bills of health, or, in other words, a certificate that the port of departure was quite free from any disease, a period of from eight to ten days (according as there shall or shall not be a medical officer on board) must elapse after sailing before free pratique shall be granted.

This precaution was to continue in force until the Turkish Government had completed the promised sanitary organization throughout their dominions, and also until European medical officers had been appointed by the different States, represented at the Conference, to reside as official superintendents of health in the principal towns and seaports of Turkey, after the example set by France ten or twelve years ago.*

It was decided that quarantine for the plague can only be duly performed in a port which is provided with a properly-appointed lazaret, where cargoes and persons may be landed for fumigation and the other customary appliances of disinfection. Mere detention on board ship and exposure to the air should not be deemed sufficient.

Moreover, the old and obsolete (it had been thought) threefold classification of cargoes and articles of merchandize is virtually retained: viz., into the highly susceptible, or such as are deemed especially liable to receive and retain the poison germs of the plague —the moderately susceptible—and the non-susceptible. Woollen and silken goods still belong to the first class; cotton and linen goods to the second. Disembarkation into a lazaret, and fumigation, &c., are to be obligatory for the former; but these measures are optional, or at the discretion of the health authorities, for the latter.

Letters, books, and newspapers, also all live animals, shall continue to be treated as hitherto.

It is satisfactory, notwithstanding the retention of such rigorous practices, to know that all the delegates, with the exception only of the Papal and Neapolitan, confirmed the important result of Sir W. Fym's observations in 1844, that not a single authenticated instance of the plague has occurred in any lazaret throughout the Mediterranean

* Among the recommendations of the Conference was that of advising the appointment of resident official physicians in different places in the West Indies, &c., for the accurate study, on the spot, of yellow fever. But abundant evidence, of the most instructive description, has since then been obtained, during the long and wide-spread prevalence of the pestilence in various countries of the New World since 1851. It is not more evidence that is wanted, but more of impartial discrimination and the simple love of truth in dealing with what is already before us.

among all the men engaged in handling the cargoes of infected or suspected vessels, or of a case of the disease having ever been known to be introduced into a country by cotton bales or other similar goods.

So much for the quarantines recommended by the Conference against the cholera, yellow fever, and the plague. In order to make, it would seem, assurance doubly sure on the side of presumed safety by such measures, it was resolved that, even after the certified cessation of any one of these diseases in a place, a specified period must elapse before clean bills of health should be issued therefrom, viz., of ten days for the cholera, twenty days for yellow fever, and thirty days for the plague.

But in addition to these three diseases, the occurrence of other transmissible diseases, as typhus, small-pox, &c., on board a vessel shall warrant the imposal of such quarantine as the local authorities may determine upon the infected vessel itself, but not upon the country whence she came, nor upon other vessels arriving therefrom. In other words, the quarantine shall be individual, not general;—on the sick ship, but not on her port of departure. It is most necessary to attend to this distinction in all considerations of the subject.

Besides the various points already noticed, there were several other incidental and connected topics learnedly discussed by the delegates. One of the most important of these was the existing sanitary and hygienic condition of Turkey and Egypt, and the results of the system of health police which had been established in these countries ten or twelve years previously. The remarkable cessation—may it prove permanent!—of the plague in the very countries which had for ages been regarded as the chief birth-place and nursery of the pestilence, and the fact of this cessation being nearly contemporaneous and concurrent with the establishment of comprehensive sanitary measures, were set forth, with numerous interesting details which cannot, however, be given here.

The defective sanitary state of most merchant ships, and the much-required improvement of the accommodation for the crews, as well as of their victuals and of the quality of the water supply, attracted much attention from the Conference. All the members concurred in the necessity of a more minute and vigilant inspection of vessels, and of all on board, both before departure and upon arrival. A large amount of sickness and many deaths during the voyage would thus be prevented, and the working efficiency of the crew materially increased.

The unwholesome condition of most sea and river port towns, and of docks and harbours, notoriously favouring the development and spread of all epidemic diseases, was also universally admitted; and great praise was awarded to the first General Board of Health in this country for the views promulgated by it on this head.

To mark their sense of the risk to the public health by the neglect of sanitary measures on board merchant vessels, the Conference resolved that ships arriving in a foul and unwholesome condition, even although they had clean bills of health and no sickness had occurred during

the voyage, should be treated as if they had foul bills, and be subjected to quarantine detention and purification.

In the converse case, however, no abatement of the usual restrictions was proposed.

Such is, I believe, an exact epitome of the six months' labours of the International Conference, drawn from the minutes of their proceedings which were printed at the time by the French Government, but have not been made public. The convention, based upon and embodying the results of their deliberations, has hitherto been adopted by only a few of the represented Powers, viz., by France and Sardinia, in the first instance, and at a later period by Portugal, Tuscany, and Turkey. This country among others has, most wisely I think, declined to follow the example; for there is certainly much in the proposed restrictions upon freedom of intercourse, on account of the apprehended risk of imported disease, that appears to me to be unnecessary, and therefore objectionable. And it is a fact not undeserving of notice, that, in more than one of the countries which took part in the Conference, the quarantine system pursued since 1851 seems to be now actually more vexatious and oppressive than it was before.

The only comment which I propose to make on the leading conclusions of the Conference are in the form of two interrogatories, addressed to the medical profession, with the view of directing attention to an exact and scrutinizing investigation of the points submitted.

1. What evidence is there to show that any of the three diseases against which quarantine is specially directed, viz., cholera, yellow fever, and the plague, has ever been introduced into any place or country by a vessel on board of which no case of disease had occurred during the voyage, and which was also free from sickness on arrival?

2. On what trustworthy evidence rests the doctrine that, while the lapse of five days of exemption from any signs of the cholera among the crew and passengers in a ship is considered to be a sufficient guarantee against the risk of that disease being imported, double and triple that period is necessary for the like security in respect of the yellow fever and the plague?

The elucidation of these two questions is, it is obvious, intimately connected with a right decision on the fundamental principles of existing quarantine legislation and practice.

THE END.

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COVENT GARDEN.

THE

INTERNATIONAL ASPECTS

OF

QUARANTINE LEGISLATION.

From the Transactions of the National Association for the Promotion of Social Science, 1862.

BY GAVIN MILROY, M.D.,
FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, ETC.

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THE large and lengthened inquiry instituted by the Public Health Department of the Association at the beginning of the year 1859 was brought to a close last year, upon the presentation of their report by the committee which had conducted the inquiry. This report, after being submitted to the council, was communicated to the Board of Trade, and was subsequently printed by order of the House of Commons, on the motion of Mr. Cave, M.P. for Shoreham. Among the voluminous mass of official evidence, procured from her Majesty's consuls and the governors of British colonies during the course of the inquiry, and a digest of which is contained in the two parliamentary papers printed in the previous year, there is a large amount of information on the existing quarantine regulations and practice of different countries, and on the bearings of such regulations and practice upon commercial and general international intercourse. Primarily and mainly the subject was of course investigated by the committee as a great public health question; and accordingly special attention was paid, throughout the inquiry, to quarantine as a long-established means adopted by most nations for the presumed protection of their people against the importation of dangerous diseases from abroad. This was the original, and this is still the professed and ostensible, object sought for by the system—viz., the preservation of the health of a community from the invasion of a foreign cause of mischief. How far this object has hitherto been attained—or, in other words, what have been the practical results of the system from past experience—may be gathered from the above parliamentary papers. The state too of existing lazarets, and of other means of accommodation provided in different ports for the cure of the sick on board vessels put into quarantine, and also for the reception of the healthy part of the crew and passengers during the imposed period of detention, as well as for the purification of goods or of cargoes supposed to be infected, attracted the special attention of the committee; and on this head also much useful information was obtained.

But besides these and such-like hygienic matters, there are, it will be seen, various other topics of consideration arising out of the evidence which has been published—topics of a more purely social and commercial nature, and relating to the general intercourse of peoples with each other. An able writer, in one of the leading professional reviews of the day, speaks thus of the published labours of the committee:—"These papers on quarantine we can earnestly recommend to the attention of our medical brethren; and, had we an influential voice, we would recommend them, and even more earnestly, to the notice of statesmen and merchants, in as much as they relate to matters of the first importance in their bearing not merely on commerce and the public health, but also on the liberty of the subject and the cause of humanity throughout the world."* Nor will this statement be considered, I think, at all exaggerated by any one who will take the trouble to make himself acquainted with what has been done, and what is still being done, in some countries by their quarantine authorities, all too under the guise of the alleged protection of the public health.

And now, first, as to the real and full meaning of the term "Quarantine," when carried out into practice, and as to the nature and extent of the restrictive measures embraced in this department of health police. It is most necessary that there should be no mistake on this point, as in too many scientific inquiries much useless disputation has often arisen from the want of a clear understanding of this essential preliminary. Many persons, even professional men, speak of "Quarantine" as if it simply related to the segregation and detention of vessels with actual sickness on board for a certain number of days, until all risk of infection either from the passengers or cargo had passed over, and until free communication with the shore might be safely established. If it were indeed so simple and intelligible an affair as this, an infinitude of diplomatic correspondence, as well as of commercial interruption, and of personal inconvenience and suffering, would assuredly have been spared. But in ninety-nine out of every hundred—nay, we might say rather in nine hundred and ninety-nine out of every thousand—vessels placed in quarantine, there has been neither any sickness whatever on board during the voyage, nor is there any trace of sickness upon arrival. It is not the ascertained presence, but the conjectural apprehension or suspicion, of sickness in the vessel, or in something on board of her, that is for the most part the alleged cause of the enforced detention. This is the root of all the worst grievances and the most strange anomalies which have been, and still are being, perpetrated under its name. The whole system rests mainly upon an idea, upon certain speculative and theoretical assumptions of science, infinitely more than upon any demonstrable or demonstrated facts, or results of actual experience. Such being the case, we cannot be much surprised to learn that, on various

* The British and Foreign Medico-Chirurgical Review, *April*, 1862.

occasions, it has been used rather for political than for hygienic considerations, to impede the freedom of commercial and personal intercourse rather than to prevent the introduction of any disease; while, at other times and in other places, it has been and still is kept up mainly on fiscal grounds, for the exaction of certain fines and dues upon shipping, and for the remuneration of officials much more than for any other purpose.

In many respects, the practice of "Quarantine" has not been unlike that of the Passport system, in its objects as well as in its results. Both are avowedly meant to guard against the admission from abroad of some dangerous element or another into the place of arrival; but virtually, as hitherto conducted, they have done little more than inflict no small inconvenience and expense upon innocuous persons, and impede safe and speedy transit of men and things from one country to another. And it is certainly a noteworthy coincidence, that the stringency and severity of the quarantine regulations in a country have been, of late years, very much in an inverse ratio to the progress there of exact medical observation as to the circumstances which favour the rise and spread of epidemic diseases, and also to the advance of enlightenment on social and political science among the people generally.

One of the causes of the slow progress of more rational views in respect of quarantine, and of the discrepancy of opinion that still prevails, even among some educated persons, upon certain fundamental points of practice, has been the great want of authentic information as to the results of the system hitherto, in the various ports and countries in which it has been chiefly in force. Until the recent inquiry instituted by this Association—an inquiry which, be it remembered, arose from the extravagant restrictions upon personal and commercial intercourse throughout the Mediterranean, four years ago, consequent upon the local outbreak of a malignant fever in a squalid Arab village on the African coast—no large and comprehensive examination by this, obviously the only true, method of fairly testing the matter, had, as far as I know, been anywhere attempted; and, whatever opinion may be formed as to the soundness of the conclusions and recommendations which the committee have put forward in their report, all will admit the great value of the documentary evidence which was brought together through the aid of the Foreign and the Colonial Offices. It was mainly from the want of such accumulated evidence as to the past results of the system in different countries, and also as to the existing regulations and arrangements in respect of it, that the labours of the costly International Sanitary Conference held in Paris in 1851, when no fewer than thirty learned delegates were in deliberation for upwards of six months with all the *éclat* and advantages of official authority, proved so fruitless of any useful result.

What is now chiefly wanted is to amplify and complete, possibly also to correct, the documentary evidence laid before the public, by an impartial and sifting examination on the spot into the recent actual working of the system in those Mediterranean and other ports in the

south of Europe, where it is at the present time most in force—as in those of Spain, Portugal, and the Ottoman empire.

That the appointment of one or two commissioners from this country with instructions to visit these ports, and to obtain, by direct communication with the authorities and other resident parties well acquainted with the subject, all the necessary information, might be productive of good, and would conduce to the enlightenment of the public mind throughout Europe generally upon a subject of no small international interest, and on which there is still much ignorance in most countries, can scarcely be doubted. It was with the view of urging this recommendation, that a deputation from the council of the Association recently waited upon Lord Palmerston, who, after attentively hearing the arguments in its favour, promised to bring the matter under the attention of the Secretary for Foreign Affairs, and of the President of the Privy Council.

All that I propose to myself, in the sequel of this paper, is merely to invite the attention of this department to a short summary of the present and existing laws and regulations on quarantine in the different countries of Europe. In this way, the diversity and discordancy of the whole system will be made apparent.

It will be convenient to begin our remarks with Holland. At no period have quarantine regulations been strict in the ports of this country; and when adjacent countries, our own among the number, were maintaining a rigorous and costly interdict upon arrivals from the Levant, Holland afforded a ready admission to them, to the no small profit of her commerce. At the present time, "the quarantine regulations of this country," says Consul Flowers, "may be considered almost a dead letter." In her West Indian colonies, however, a rigid system appears to be still enforced.

The countries eastward and north of Holland, including the Hanse Towns and the Baltic States, have within the last few years much relaxed their quarantine restrictions. At Hamburg, since 1856, all that is done is that vessels arriving from an infected port, or with actual disease on board, are inspected at the outport of Cuxhaven by a medical officer, with whom rests the responsibility of adopting such hygienic precautions as he deems fit for the preservation of the public health.

In Denmark, the former stringent code was abolished in 1852. Consul Taylor remarks, that "in any reform which the Danish government may make in the existing regulations, it will be much influenced by the measures which are taken in other countries, and especially in England. The desire exists to make the intercourse with other ports as free as possible."

In Sweden, also, a great change has taken place of recent years. Down to 1854, the first year of the Russian war, a rigorous system was maintained; but since that year numerous restrictions have been removed, in regard not only of quarantine, but of various other social and international subjects.

It is not easy to determine with precision the existing regulations

in the Baltic ports of Russia. During the foolish alarm in 1858, occasioned by the outbreak of a malignant fever at Bengazi on the north coast of Africa, all arrivals from any port in the Mediterranean were subjected to quarantine detention at the entrance of the Categat before they could proceed on to a Russian port; but, notwithstanding this, it seems to be generally believed that Russia is disposed to follow the example of her neighbours in the Baltic. As regards her ports in the Black Sea, the war of 1854-5 led to important changes. Prior to that time, a most rigid system of restrictions was kept up at the mouth of the Danube, for the purpose of preventing, it was alleged, the introduction of dangerous diseases from the adjacent Turkish provinces. This has entirely ceased during the last eight years; and no impediment now exists, on the part of the Russian authorities, to the free navigation of the Danube. The vast quarantine establishment at Kertch, on the east coast of the Crimea, was destroyed during the war, and has not, I believe, been restored.

Starting afresh from Holland, but in an opposite direction—viz., to the south and westward—we come first to Belgium, where, according to Consul Grattan, the existing acts and regulations are nominally, rather than actually, in force; although lengthened periods are assigned for different cases, "practically a quarantine of more than from three to five days has been rarely enforced." The general feeling among persons best informed on the subject is, he adds, rather to relax than to add to their stringency.

France is one of the few countries which has adopted the conclusions and recommendations of the International Conference held in Paris, in 1851, as the basis of its existing quarantine code. A summary of the proceedings of this conference was read before the meeting of the Association in Bradford, and will be found in the volume of its Transactions for 1859. The regulations are very complex, and many of them stringent and severe; but full power is vested in the minister of commerce to modify or dispense with them as he sees fit, so that virtually the imposal of quarantine, in all cases, rests with the government; and this power is, of course, exercised with as little interruption to personal and commercial intercourse as possible. In the recent case at St. Nizaire, at the mouth of the Loire, when several cases of yellow fever occurred on shore soon after the arrival of a vessel from the West Indies, measures of extraordinary rigour, even to the scuttling of the vessel, are said to have been adopted; but, unfortunately, the particulars have not been officially made known, and great reticence has been maintained by the authorities as to the facts of the case.

In Spain and in Portugal the state of things is very different from what it is in France; for in these two countries the central boards of health are more or less independent of the executive government, and they have the principal, if not the sole, voice in all matters relating to quarantine. In both, the system at present in force is extremely rigorous, even in the case of arrivals from ports in which no disease existed at the time of departure, and when no illness whatever had

occurred during the voyage. The replies of our consuls at the Spanish ports of Vigo, Malaga, Alicante, and Carthagena, and also at Lisbon and Madeira in the Portuguese dominions, contain many instances of what it would be difficult to credit, if the statements were not from such unquestionable authority. Consul Mark, writing of the practice at Malaga, says: "Arrivals from Egypt with raw cotton are admitted to pratique after eight or ten days' voyage, while arrivals from England with a cargo of coals, and after a passage of from twenty-five to forty days, are all quarantined for three days;" and this for the sole reason that England does not maintain a sufficiently strict quarantine system. Two years ago, one of our ships of war arrived at Vigo from Plymouth; all on board were in perfect health, but the captain had neglected to bring a bill of health. A quarantine of ten days was imposed, and no letters were permitted to be landed from the ship, until they had been previously cut and dipped in vinegar!

But still more oppressive and serious restrictions have been inflicted of recent years at Lisbon and other Portuguese ports, on the plea of guarding the public health against the introduction of dangerous diseases. At the beginning of 1860, the whole coast of Brazil was declared by the Lisbon Board of Health to be infected with the yellow fever, in consequence of its prevalence in one or two places; and a vessel, which had arrived from Para with sickness on board, was ordered to quit the port or she would be sunk, and the susceptible portion of her cargo was ordered to be destroyed.

Three years previously, this fever had broken out in Lisbon notwithstanding the most rigorous quarantine, and had committed great ravages in that very filthy and ill-drained city; and so great was then the alarm at Madeira, that the authorities of that island refused to allow the landing of any passengers from our royal mail steamers, if they had taken on board any person at Lisbon on their voyage out, notwithstanding the perfect health of all on board during the passage. The result was that the passengers bound for Madeira, who were chiefly invalids who intended wintering there, were obliged to go on with the vessel to Brazil, and thus return to England as best they could. As I have said, the Lisbon health authorities are alleged to be quite independent of the government, which has no voice in the matter. If this be really so, and it is difficult to imagine that any reasonable government could sanction such proceedings as the above in the present day, it is surely high time for the legislature of the country to alter the law. From no place in the world are so many quarantine notifications received by our Board of Trade as from Lisbon; they are continually appearing either in the gazette, or as notices at the head of the shipping list.

Passing now up the Mediterranean, we come first to the ports of Italy. Previous to the war of independence, there was no country, not excepting even Portugal, where the quarantine regulations were more stringently oppressive than the kingdom of the Two Sicilies. Fortunately for general and commercial intercourse, this state of things no longer exists; having been replaced by the much more

simple and enlightened system pursued at Genoa and other ports of Sardinia, which is nearly the same as that in France, being based on the recommendations of the International Conference of 1851. Virtually, it rests entirely with the minister of marine to carry the regulations into effect, acting upon the advice of the directors of public health at Genoa and at Cagliari.

As to the practice pursued in the ports of Austria, I am unable to give any information, as the committee did not receive any reply to their queries either from Trieste or from any other Austrian port.

Greece appears to follow the example of Portugal, and of Naples as it used to be. Mr. Neale, our consul at the Piræus, says:—"There is no doubt that the health office here can do what they like. It is a general opinion in the Levant, that political motives are often at the bottom of the measures taken in respect of quarantine."

The existing quarantine regulations of the Turkish empire are those which were pressed upon the Porte, much against its will, by most of the European governments, about two or three-and-twenty years ago. They are so complex, and withal so obscure, that it is scarcely possible to ascertain their exact import, as any one will find who will look over them in the parliamentary paper issued two years ago,* and which contains some very instructive correspondence between our Foreign Office and the Board of Trade on the one hand, and Sir H. Bulwer, our ambassador at Constantinople, on the other, relative to the present state of Turkish quarantine. It would seem that, soon after entering upon the duties of foreign secretary, Earl Russell's attention had been directed to the inquiry, which had been recently instituted by this Association, into the subject of quarantine in the Levant and elsewhere; for, in July 1859, he had called upon Sir H. Bulwer to transmit, with as little delay as possible, information on various points respecting the existing regulations in Turkish ports. In consequence of a memorial from the Chamber of Commerce of Newcastle-upon-Tyne, relating to some oppressive quarantine toll connected with the bills of health, and levied upon all vessels passing the Dardanelles, which was addressed to his Lordship at the beginning of 1860, Sir H. Bulwer was directed to apply to the Porte on the subject. The Porte at once acceded to the representation, and proposed not only to reduce the number of days' detention assigned for any irregularity in the bills, but even to grant an exemption from the liability to any quarantine detention, on condition of the payment of certain specified fines. Our Board of Trade, to whom this proposal was referred by the Foreign Office, very properly remarked, that "quarantine is established and recognised by international usage solely for common security and protection against diseases supposed to be importable, and it is contrary to all sound principle that it should ever be imposed for the purpose of providing a revenue to the country in which it is established.". The letter of Sir J. Emerson Tennent,

* Paper respecting quarantine in the Mediterranean, presented to the House of Commons, May 7, 1860.

from which this passage is quoted, alludes at its close to "the prejudicial operation of the quarantine regulations in force in the Ottoman empire upon the commerce of this country in the trade of the Levant." It is but fair, however, to the Turkish government to add, that the Quarantine Board at Constantinople is composed of delegates from the embassies and legations of the different countries of Europe represented there, and that the Porte has not the power, of itself, to alter any of the existing regulations, but only with the consent of the board; which must, therefore, be held mainly responsible for the defects or errors of the existing system. A thorough revision of the whole code is much wanted, to bring it into accordance with the teachings of experience since it was framed, at the instance of the European governments, in 1840.

Passing from Europe to America, I shall now briefly glance at the state of quarantine legislation and practice in the United States, previous to the outbreak of the civil war. Each seaboard state had its own separate and independent regulations; and, as these were framed without regard to what were in force in any other state, there was a general want of uniformity, and on several points a notable discrepancy, in the system pursued in places which were in constant communication with each other. The result was that the regulations, although very exact and stringent on paper, were seldom carried out with any rigour, and the whole machinery was generally very lax in operation everywhere.

In 1857, an influential convention of delegates, consisting of many of the leading medical men and merchants of the principal seaport towns in the union, was held at Philadelphia, for an examination of the whole subject, and with the view of adopting a more uniform system throughout the country, it having been unanimously declared that "the present quarantine regulations in most of our states are inefficient, and often prejudicial to the interests of the community." Subsequent annual meetings of the convention were held at Baltimore and at New York. Valuable reports of their proceedings have been published. It may be remarked that, notwithstanding the nominal stringency of the regulations in some of the states, the practice of quarantine in American ports has seldom or never been so vexatious or oppressive as in most countries of Europe, in consequence chiefly of the large discretionary powers vested in the medical officer of the ports and in the local board of health, the responsibility to the community being secured by the publication of an annual report of all their proceedings.

And now, in conclusion, for a few words as to the regulations and practice of quarantine in our own country, with a remark or two on the state of things relating to it in our different colonies. The existing acts of parliament and orders in council have long been, for all practical purposes, nearly obsolete. It is exclusively to the apprehended importation of the plague of the Levant, the yellow fever of the West Indies, and the Asiatic cholera, that these ordinances refer; they take no cognizance of, nor provide for any precautionary measures against, the much more common and fatal diseases of smallpox or

typhus on board vessels upon arrival. Hence it was that, in the case of the extremely sick Egyptian frigate whose arrival in the Mersey two years ago occasioned much alarm, and was followed by considerable loss of life, the Privy Council had not the power, under any existing order, of direct interference. For the last fourteen or fifteen years, no detention has been imposed in British ports on arrivals from the Levant or elsewhere, on account of the plague—which, it may be remarked, has for about the last twenty years, with the exception of the local outbreak at one single point of the African coast, been absent from the East. It has been chiefly against the yellow fever that quarantine measures have been directed of recent years, and this has been chiefly at Southampton, in the case of the mail steamers from the West Indies and from Brazil; but in no instance has the detention of a sick vessel exceeded a couple of days, nor has any special purification of the cargo been required. In respect of the cholera, quarantine has been all but abandoned since 1848.

As respects our colonies, the utmost discrepancy exists in their quarantine legislation and practice. Gibraltar, Malta, and the Ionian islands are compelled against their will, by the fear of retaliatory measures on the part of some of the adjoining countries, to follow the general system pursued in the Mediterranean. In our North American and Australian colonies, the practice of quarantine is confined to the detention of such vessels as have actual disease on board upon arrival, quite irrespective of the place or country from which they come, for the purpose of landing the sick, the recovery of the convalescent, and the purification of the ship, before proceeding up to any wharf or dock in the port of her destination. Quarantine seems seldom to have been practised in any part of the Indian peninsula, or at any of the adjacent islands. Indeed, the only island in the Indian ocean where, as far as I am aware, any systematic attempt is made to prevent the importation of diseases by shipping, is the Mauritius, which has adopted, of recent years, measures of great stringency and rigour against two diseases in particular—cholera and smallpox.

Among our West Indian colonies the greatest diversity of practice prevails, and sometimes, too, in colonies close to each other. At Barbadoes, for example, quarantine has of late years been all but discontinued, while rigorous measures have been enforced at Trinidad and Guiana, on account of the very same diseases. Bermuda, situated between the West Indies and our North American colonies, is, of course, frequently visited by our ships of war; and it is also an important military station. There too, as elsewhere, the system followed has varied much at different times. Recently, it must have been more than usually stringent and severe, as it has been stated that, in the course of last year, H. M. S. Barracouta, from Jamaica, was actually prevented by the civil authorities from having any direct communication with the shore, or even from landing her sick in the naval hospital, from the dread of introducing the yellow fever into the island; and it was only the other day that a detachment of our artillery force from Vera Cruz, where they had suffered much from

the sickly climate of that most unhealthy place, were, on their arrival at Bermuda, detained for several days on board ship before they were permitted to disembark. These instances, in connection with previous details, may serve to show how important it is to the interests of the public service, as well as of commercial and general intercourse, that the subject which I have thus rapidly sketched should not be allowed to drop, until it has received, practically, a more satisfactory solution in very many countries than it has yet obtained. Among other public bodies whose attention might be not unprofitably drawn to its consideration, I would especially mention the Chambers of Commerce in our principal towns throughout the kingdom.

M'CORQUODALE AND CO., PRINTERS, LONDON.—WORKS, NEWTON.

THE STATISTICS OF DISEASE AMONG THE PAUPER POPULATION OF ENGLAND AND WALES.

The following Memorial was addressed by the Epidemiological Society to the Right Hon. C. P. Villiers, M.P., President of the Poor-Law Board, and Chairman of the Select Committee of the House of Commons to inquire into the operation of the Laws relating to the Poor, on the appointment of the Committee in 1861.

The Epidemiological Society was instituted in 1851 for the investigation of epidemic diseases, with the special view of examining into the causes which favour their development and spread, and into the means best fitted for their mitigation and prevention.

The successful prosecution of such inquiries rests mainly on the obtainment of accurate data respecting the rise and course of these maladies in different localities and districts; and respecting the numbers of persons attacked, and of the deaths among these persons, on a sufficiently comprehensive scale.

The admirable returns of the Registrar-General furnish authentic information as to the number of deaths from different classes of disease; but they afford no materials for ascertaining the number of persons attacked. This has been long felt by all epidemiological inquirers to be a desideratum, which it would be of the utmost consequence to supply. The statistics of *disease* are not less necessary than the statistics of *mortality*. It has been estimated that, taking one disease with another, there are between twenty and thirty cases of sickness to every death; but, as yet, we do not possess reliable data to enable us to determine the truth on this point, which it is obviously of public importance to ascertain among our labouring population in civil life.

It is only in the army and navy that the necessary machinery for the purpose exists at present. Thirty years ago, no use was made, to any extent, of the returns of the medical officers respecting the

amount of sickness and death in either the military or naval service. It had been long surmised that the average rates were much higher at all times than they ought to be; and it was known that great loss of life every now and then arose from epidemic outbreaks in barracks and on board ships of war. But the actual facts could never of course be accurately ascertained, until the medical returns were systematically examined and digested; and the only sure grounds for the adoption of prophylactic and preventive measures could thus be satisfactorily made out. Almost all the salutary changes which have been effected in the health of both services may be traced to the information obtained in this manner.

What has been done with such good results for the army and the navy can, in the opinion of the Society, be effected in the case of the pauper population of the country, and would be productive of equally beneficial effects.

There are more than 3,000 medical officers, under the general superintendence of the Poor-Law Board, for the care of the 14,963 parishes and unions of England and Wales. The number of cases of sickness among the out-door and workhouse poor must, at the very lowest estimate, largely exceed a million in the course of the year; and, as parochial medical officers are required to make a return of every case, there is evidently a mass of authentic statistics of disease actually existing in the country, and capable of affording the most valuable information respecting public hygiene. Hitherto, these returns have only been submitted to the local Boards of Guardians: after being seen by these functionaries, no further use is made of them.

It requires but the collecting and arranging of these materials on a proper plan to render them most instructive registers upon a large scale, which, at the end of the year, would form the basis for an Annual Report, illustrative of the health of that very class of the community among which the greatest amount of preventable disease prevails.

The Epidemiological Society, whose attention has been long earnestly applied to the consideration of the subject, have proposed a simple scheme, by which the desired information could be easily, in their opinion, obtained by the Poor-Law Board, through the voluntary co-operation of the parochial medical officers, with no other expense than that required for the regular tabulation of the materials and the preparing of the Annual Report.

The Society will feel honoured by being afforded an opportunity of bringing the details of the scheme, in its various bearings, under the attention of the Honourable Committee.

(Signed) B. G. Babington, *President.*
J. O. McWilliam, *Hon. Sec.*

March 8th, 1861.

The Society, having received an assurance from Mr. Villiers that their Memorial shall be brought under the notice of the Select Committee, have prepared the following brief statement, more fully to explain the grounds on which it is based.

At present, there are no means of determining what are the most frequent maladies existing from time to time among the labouring classes in our towns, villages, and rural districts; nor when, or where epidemics are most prevalent, or vary much in frequency and severity in different parts of the country; nor do we know, as we ought to know, the influences of age, sex, condition, and occupation on their development and fatality. Neither can we tell what are the most frequent chronic ailments or incurable infirmities among the poor at different periods of life, which occasion permanent disablement, and life-long chargeability upon the parochial rates, with but one exception, we believe, viz., insanity and idiocy.* That the amount of sickness from Fever, for example, is annually very large, the number of registered deaths abundantly testifies. On the average of the last twenty years, this number exceeds 17,000—a mortality which probably represents upwards of 170,000 persons attacked in the course of the twelve months. The victims, too, are generally among the early adults and the middle-aged, the parents often of young families; hence so many of the children in workhouses are the offspring of persons who have either died from the disease, or who, if they recovered, were reduced to beggary in consequence. The orphans and widows of working men, prematurely cut off in this way, form a considerable proportion of the permanent recipients of parochial aid in every part of the kingdom. The sad prevalence of Small-pox in many districts, from the neglect of vaccination, often serves to swell the number. How much the prevalence and fatality of Fever and of Small-pox may be reduced by due attention to well-known sanitary and hygienic regulations, it is unnecessary in the present day to illustrate. Then, again, the great excess of mortality among the children—mainly owing to the circumstance of the other eruptive fevers, and of diseases of the bowels, lungs, etc., being aggravated fourfold by domestic causes of insalubrity—attests the enormous amount of illness in infantile

* On the 1st of January, 1862, the number of insane and idiot paupers was 34,271. Of this number, 18,318 were in country or borough lunatic asylums; 1,193 in registered hospitals or licensed houses; 8,603 in union or parish workhouses; 983 in lodgings or boarded out; and 5,172 resided with relatives.

and early life among the poor. There are, moreover, various groups of disease which often cause much suffering and distress, but which very seldom prove fatal, and are therefore scarcely indicated in the Registrar-General's returns, such as maladies of the skin and of the eyes—a not unfrequent cause of protracted disablement; and as both these groups are largely dependent on unwholesomeness of the dwellings, poverty or unsuitableness of diet, neglect of personal cleanliness, etc., it is obvious that they might be easily prevented to a great extent.

Whatever will diminish the amount of sickness among the working classes, must correspondingly diminish the amount of the parochial taxes, and *vice versâ*. That the first of these desirable objects is within our reach admits of no doubt; the results of the Common Lodging-House Act, and the low rates of sickness and death in most public institutions now, as compared with what they used to be, are sufficient proof on this head. Nor are instances wanting in several parts of the country, where a not inconsiderable abatement of the parish charges has recently been effected, by the improved health of the districts. If it be true, as has been stated on respectable authority, that three-fourths of all the actual paupers in the kingdom have become paupers, directly or indirectly, by disease, the large extent of the field for the labour of enlightened beneficence is strikingly apparent.

It is scarcely possible to over-estimate the benefits to the whole community which would accrue if the attention of parochial boards and other local authorities, as well as of influential residents in a district, were regularly and systematically drawn to the current state of the general health, and to the prevalence or otherwise of epidemic disease among their out-door poor, and also to the hygienic condition of the inmates of their workhouse. In no way could this be so easily or so effectually done as through the returns —were these duly tabulated and arranged—of the medical officers who attend upon the poor in sickness; for none know so well as these gentlemen the evils which sap the health of the labourer, and which so often issue in pauperism and mendicancy. All agree that much of the illness and mortality in humble life is due to circumstances not inevitable or inseparable from mere poverty, but which are superadded to it either from ignorance or wilful neglect, or from causes over which the poor themselves have no control, however capable the evils may be of easy correction or removal.

There are in England and Wales upwards of seven hundred workhouses, great and small, and six district schools, where pauper children are lodged and fed. The total number of inmates, of recent years, has averaged about 140,000 persons, of whom 50,000 are under sixteen years of age. In the infirmaries of workhouses, there are usually—besides the ordinary sick wards, the infirm wards for aged men and women, and the nurseries for infants and young children—fever wards, and infectious and foul wards; a fact which alone indicates the prevalence of these maladies

throughout the country among the poor. The general death-rate in our workhouses is not known; but that it is very high may be inferred from the fact that, in some years, one in every eleven deaths in London occurs in the metropolitan workhouses. In 1861, the number was 5,755; while the total number in all the civil hospitals of the metropolis was only 3,723. "The death of so many persons in the large workhouses demands inquiry," remarked the Registrar-General.

The sanitary condition and arrangements of the workhouses in different parts of the country are reputed to be far from satisfactory; the occasional severe outbreaks of epidemic disease, and the inveteracy of various chronic maladies among the inmates, can only be accounted for in this way. In a late quarterly return of the Registrar-General, the large mortality which occurred in a provincial workhouse was stated to be due "to the crowded state of the house, and the defective drainage of the premises."

The want of reliable information as to the current amount of sickness and death among the out-door and in-door poor has been so much felt, that several efforts have recently been made to obtain the desiderated data in separate districts and localities. The metropolitan medical officers of health attach the utmost value to this subject in the prosecution of their inquiries, and have laboured hard to establish regular statistical returns of disease occurring in the metropolis. The Sanitary Association of Manchester and Salford has also applied itself with great zeal to the same object in respect of their population. At the International Statistical Congress, held in 1860, the importance of the accurate registration of diseases and of their results in hospitals throughout the kingdom was strongly urged in the Public Health Section, and steps were then taken to carry the suggestion into effect as regards these institutions. Such a measure is equally, if not still more, needed in respect of workhouse infirmaries. Among various other matters of great interest to the public health, on which useful information might be obtained from this source, the discovery of the amount of incurable blindness, deafness, and deformity among the poor may be mentioned. Every consideration thus shows how inestimable would be the value of a general and connected system of disease-registration among the pauper population over the entire country.

The scheme proposed by the Society for this end is, that there should be a monthly return of the number of cases of illness treated by each parochial medical officer, and of the number of deaths among these cases,—arranged upon such a plan as that in the annexed Schedule, in which a few of the supposed details are entered, and the general results given, to indicate the mode of filling it up. But the exact form best suited for the purpose will doubtless need much consideration. The great object sought for is to turn to useful account the statistical records of disease now required to be made by the medical officer, but which, hitherto,

have been valueless and unknown; and thus to furnish a ready means for ascertaining, from month to month, the nature, the extent, and the gravity of the sickness among the poor prevailing in different districts of the country, together with the approximate ages of the sick, and a brief notice of the local circumstances affecting the health of the people. That the parochial medical officers would very generally afford willing co-operation in the carrying out of the proposal, the Society anticipate with confidence; none of their professional brethren have shown themselves more active promoters of every reasonable measure for improving the condition of the poor, and for advancing the best aims of the healing art, than these gentlemen. What has been done by the medical officers of the metropolis and of Manchester and Salford, would doubtless be done elsewhere. The labours of each and all, by becoming instrumental to an important scientific and social end, would rise in public usefulness and therefore in public esteem; for whatever exalts a profession in character, is sure to strengthen it, in the long run, in influence and weight.

By the monthly returns being regularly transmitted to the Poor-Law Board, or to the Medical Department of the Privy Council, the current state of the public health over the country would be, to a great extent, ascertained at short intervals of time, and the springing up and threatened prevalence of dangerous zymotic diseases would be discovered early, and before the leaven had leavened the whole mass. What is now being done by the Board of Trade for Meteorological inquiries might, with no less advantage to the whole community, be done by another government department for Hygienic research. An Annual Report, founded on these monthly returns and embodying their chief facts and results, on the same plan as the annual reports of the health of the army and of the navy, could not fail to be of great scientific value. It would, moreover, be directly and immediately useful in various ways. The labours of local boards, for instance, would be aided and guided by the authentic information made accessible, and the results of these labours would become generally known. Thus the good example of one place would stimulate imitation in another; means and appliances, found useful here, would be copied elsewhere; and, in this manner, local experience would be made profitable to the whole community. No other country in the world possesses such facilities for the attainment of the object in view as England, for no other country has such a well organised system of pauper relief; and, when it is considered that nearly six millions sterling are annually expended for this purpose, it is but right that the working of the system should subserve, as far as practicable, the promotion of science, and the advancement of the general good.

B. G. Babington, *President.*

Gavin Milroy, J. N. Radcliffe, } *Hon. Secs.*

April 1863.

Parish or Union of *Population in* 1861. *Males* ; *Females*

1864. January. MONTHLY RETURN OF SICKNESS AND MORTALITY AMONG *OUT-DOOR** PAUPERS, Etc.

Remaining from last month: Males	Remaining: Females	60—80 years	40—60	20—40	5—20	Under 5	Deaths among these Cases: Males	Females	60—80 years	40—60	20—40	5—20	Under 5	DISEASES	New Cases: Males	Females	Under 5 years	5—20	20—40	40—60	60—80	Deaths among these Cases: Males	Females	Under 5 years	5—20	20—40	40—60	60—80	Remarks Illustrative of 1. Locality. 2. Dwelling. 3. Occupation. 4. Food, Drink, etc.
8	7	..	2	6	5	1	1	..	..	1	..	..	..	Continued Fever.	20	17	8	15	14	..	..	2	1	..	1	1	1	..	
10	13	..		8	7	2	2	1	..	..	..	2	1	Scarlatina.	22	16	15	26	7	..	..	3	5	4	2	1	..	..	
														Measles.															
														Hooping-cough.															
														Scrofulous Diseases.															
														Phthisis.															
9	11	7	4	4	2	2	1	1	1	1	..	..	..	Diseases of the Respiratory Organs.	42	35	15	16	8	18	20	4	6	2	..	..	5	3	
														" " Nervous System.															
8	10	..	..	6	12	..	..	..	..	..	..	..	..	Diseases of the Skin.	17	14	5	22	4	..	..	..	..	..	..	..	..	..	
5	4	..	..	..	6	2	..	..	..	..	..	..	..	" " Eyes.	10	15	4	15	6	..	..	..	..	..	..	..	..	..	
														Abortion.															
														Atrophy.															
														Accidents.															
														Poisoning.															
102	115						5	4							490	500						21	17						
217							9								990 217							38 9							

Total No. of Cases treated, 1207. Total No. of Deaths, 47

* A similar monthly return for the in-door or workhouse paupers would be required.

EPIDEMIOLOGICAL SOCIETY.

ON THE SICKNESS AND MORTALITY IN THE FRENCH ARMY, DURING THE CAMPAIGN IN TURKEY AND THE CRIMEA, IN 1854-56.

By GAVIN MILROY, M.D., Fellow of the Royal College of Physicians, and Member of the Sanitary Commission to the British Army in the East.

MILITARY medicine presents a singularly favourable field in many respects for the study of various epidemic diseases.

Their development and rise with the circumstances and phenomena which may precede or accompany it, their course and progress, and their decline and disappearance, can all be watched among a large body of men with the utmost exactitude. Then, the several conditions which favour their occurrence, or which modify their type, are under the immediate observation of the medical officer. He can trace and follow each case from its very commencement, and may thus more easily and accurately discover the cause or causes which appear to have produced it. The constitutions and former health of his patients are known to him. He can ascertain where they have been, how they have been occupied, whether they have been exposed to fatigue, or to peculiar atmospheric vicissitudes, and whether they have been in communication directly or indirectly with other persons affected with the disease. Their diet and clothing, the quality of their food

and drink, as well as the nature and condition of their accommodation, are under his continual cognisance.

It is a point of the greatest importance in all epidemiological inquiries to determine beyond dispute, and to record at the time, the exact dates of the first few cases of attack in an epidemic outbreak, with the circumstances attending the occurrence of each case; for it is upon the accurate knowledge of these particulars that some puzzling questions respecting the origin and the mode of spreading of the disease can alone be satisfactorily solved. In the army, this information may always be had. And if the medical officer will take the trouble to obtain at the same time like information respecting the disease among the civil population in the immediate neighbourhood of his barrack or cantonment, and also among the ships of war on the station, if he be placed at or near a seaport, his testimony would go far to settle several of the most disputed problems of ætiological medicine.

The influence, too, of different climates, and of different topographical sites, as to elevation, geological features, etc. on the same disease, can also be studied with peculiar advantage by the military physician.

The late campaign in the East afforded a good opportunity for the observation of certain epidemic diseases on a great and extended scale, and fortunately the opportunity has not been lost to medical science. Several valuable works illustrative of the subject have been published both in this country and in France. Of these, the *Relation Médico-Chirurgicale de la Campagne d'Orient*, by M. Scrive, who was at the head of the medical department of the French army throughout nearly the whole period, is especially worthy of notice and commendation. His detailed and connected record of the health of the army, from first to last, in this in every respect memorable campaign, is most instructive.

I have thought that a brief summary of the leading facts of his narrative, with a few comments and remarks *en passant* on the great truths which these facts ought to teach us, would form a not unsuitable subject for a paper to be read before a Society whose professed object is the investigation of the causes of diseases, with special reference to their mitigation and prevention. Almost all the details will be taken from M. Scrive's work; a few only from other sources of information.

The first French troops, about 8000 in number, landed at Gallipoli, on the European shore of the Dardanelles, at the end of March, 1854. Like all other Turkish towns, Gallipoli

is very filthy and unwholesome; narrow winding streets, with stinking black gutters in the middle, and heaps of foul rubbish everywhere on the surface. Most of the houses in the lower part of the town are huddled together, dark and unventilated; the amount of abomination underneath them can only be guessed at. The well water is often impure. The climate of Gallipoli is fine and considered to be healthy; it is not unlike that of the south of France and north of Algeria.

The troops were camped out a few miles beyond the walls. Two or three buildings in the town were taken possession of and converted into a hospital, but without due preliminary precautions having been adopted to fit them for that purpose. The result was that they had very soon to be abandoned, in consequence of their unwholesomeness. This was invariably found to be the case throughout the whole campaign, whenever native buildings were made use of for the sick, without a previous thorough purification below as well as above ground, and the existing means of ventilation being much improved.

By the beginning of May, 24,000 men had arrived at Gallipoli. There was very little sickness among them; and the only ailments were angina and bronchitis, with a few cases of intermittent fever, chiefly among the soldiers who had come from Algeria. In another month, the force had become nearly doubled. The sick-rate still continued low, not exceeding 15 per thousand of the strength. Among the fever cases at this time were a few of the typhoid type. The other diseases were the same as in May. No epidemic sickness existed. The men were fairly fed, and the camp was on favourable ground.

In consequence of the threatened fall of Silistria on the Danube, most of the troops were moved forward during June from the Dardanelles into Bulgaria, in order to be near the seat of war. By the beginning of July, the bulk of the army was concentrated around Varna, situated on the shores of the Black Sea. They were camped chiefly on the wooded heights above the town. A large Turkish barrack within the walls was prematurely occupied for a hospital; and again, as at Gallipoli, the step proved an unwise one; the building had ere long to be evacuated. For not only did the sick not recover favourably in it, but many cases of spontaneous fever occurred among the patients admitted for other ailments—*an infallible proof of unwholesomeness from some cause or other within.*

At this period, the strength of the French army in the

East had been raised to about 55,000 men. With the increasing heats of summer, the sick-list had risen rapidly, and the character of the prevailing maladies had undergone a change. The ratio of sickness was now between 30 and 40 per thousand of the strength, and was caused chiefly by bowel disorders, along with a good many cases of intermittent and bilious remittent fevers, the latter being not unfrequently associated with symptoms of a typhoid character. Many of the bowel attacks—both among the recent arrivals and among the troops which had first landed—assumed a decided choleraic type; and already sporadic solitary cases of malignant cholera (*cholera foudroyant*) had occurred at different points of the French occupation in Turkey. In the last week of June, a rapidly-fatal case happened at Varna in a zouave who had been two months in the country; and in the following week, a second case, which proved fatal in the course of a few hours. As, moreover, the *cholerine* cases had very much increased both in number and in severity at this time, M. Scrive began to dread a serious outbreak of the pestilence among the troops in and around Varna. He accordingly took the wise precaution of recommending that the tents in the encampment should be occasionally shifted from one spot to another—that they should be spread out more apart from each other—that the number of men in each tent should be reduced by one half; also that the men should be required to wear their abdominal belts at all times; that they should not be exposed to be wetted or chilled, especially at night; that the camping grounds should be thoroughly cleansed and disinfected; and that a most strict surveillance should be kept over the men, to check all attacks of diarrhœa from the very first. The food and drink, too, of the troops were also modified and regulated, as far as circumstances would permit, and their fatigue duties were abridged as much as possible.

These prudent measures would doubtless have had a most salutary result, had not circumstances, as we shall presently see, occurred to prevent their execution by calling off the great bulk of the troops elsewhere.

Simultaneously with the manifestation of cholera at Varna, evidences of its agency made their appearance among the French troops not only at Constantinople and Gallipoli, but also at the Piræus in Greece. The Russian army on the Danube also was suffering at this time from the pestilence.

Several of the transports, which left Marseilles and Toulon towards the end of June and in the beginning of July, had cases of cholerine and cholera during their voyage out, and

were obliged to land some of their sick at Malta and at Gallipoli.

The French transports, it may be remarked, were generally so much crowded that very many of the men had to remain on deck, night and day, without shelter or sufficient covering. The state of their between-decks was, of course, always most impure. Besides cholera, typhoid fever was not unfrequent on board many of them. A good many cases of small-pox occurred in several transports.

I would here observe that, independently of the amount of actual disease among troops during a voyage, it is to be borne in mind that men landing from a crowded unwholesome ship are much more liable to sickness from endemic or epidemic disease in a new country, than others who have been better accommodated, and have had the advantage of good food and shelter, with pure air, throughout the voyage. The mischief of neglect on this head is therefore twofold—prospective as well as present. This is a point in military hygiene which has not attracted the full attention which it deserves.

Throughout July, cholera was on the increase among the French troops at every station, with the exception of Adrianople, where it did not appear till the second week of August. The general sick-list of the army had nearly doubled during the first three weeks of the month, and every arrival of new regiments from France or Algeria swelled the number.

M. Scrive having observed that almost all the bad cases of cholera at Varna had occurred either among the inmates of the hospital in the town, or among the troops quartered within the walls, and that the troops camped outside the town were comparatively exempt from the disease in its malignant form, determined to empty the hospital as much as possible; ordered no more patients to be sent into it; and had all the cases in future treated in tents pitched out on the plateau beyond the walls, separating the tents well from each other, and at some distance from those of the troops, and keeping them all thoroughly ventilated. The good effects of these measures were soon obvious, and made, he tells us, a very strong impression upon his mind. These rules, he justly remarks, should invariably be acted on in the repressive and preventive treatment not of cholera alone, but of all pestilential diseases without exception.

It was at this period, while the choleraic influence prevailed extensively among the troops, that the disastrous movement into the Dobrudscha—the notoriously malarial

region on the south side of the Danube, near its embouchure —was made, with the view of threatening the left flank of the Russian army, and also in the hope, as the military authorities supposed, of exercising a favourable diversion on the *morale* of the men, who had become, as usual, depressed by inaction and increasing sickliness. *The medical staff were not consulted upon the occasion.*

Although no particulars are made known, it is pretty obvious that the needful precautionary measures for the health of troops in such an expedition, and at that season of the year when malarial diseases are always most rife and active, were entirely neglected by the officers in command.

On the 20th of July, the first division, forming the advanced column, moved from Varna. After the first day's march, several men were attacked with cholera. Four or five days then passed over without any fresh cases of a malignant character; but on the 26th—the men having now become much fatigued by successive forced marches further and further into the marshy region, and subjected all the while to most trying privations—a terrible explosion of the pestilence took place. It was like that which occurred among a British force at Kurrachee, near the mouth of the Indus, twelve years ago, only on a larger and more destructive scale. Hundreds of men were struck down at once and died within a few hours after being seized. From day to day, things became worse and more appalling. All attempts to abate the storm were in vain. The medical officers were left without any resources. Within a short week, between two and three thousand men of the division had been smitten, and more than two-thirds of the cases had quickly proved fatal. In one regiment alone, advancing inland from Kostendjie, 300 of the men were attacked within twenty-four hours, and most of them died on the spot. Appalled by the blow, the commanding officer sought to retrace his steps at once; but before the regiment could reach the coast, more than half its strength had perished, and large numbers reached it only to expire miserably on the beach.

Upon its return to Varna, says M. Scrive, the first Division, which was 12,000 strong on leaving France, did not muster more than between seven and eight thousand bayonets. Among the victims were two general officers and nine medical officers.

The second Division, which had advanced much less far into the Dobrudscha, and had consequently encountered far less fatigue and privations, suffered proportionally less; while

the third Division, forming the rear of the expedition and having advanced but a little way from Varna, was comparatively unscathed.

The history of this expedition affords a very striking proof of the influence of excessive fatigue (coupled doubtless with unsuitable and unwholesome food and drink) in a malarial district, in giving deadly force to the cholera poison. Medical experience in India and other tropical countries can furnish us with many similar instances.

While the expeditionary army in Bulgaria was suffering so dreadfully from the pestilence, the troops stationed in and around Constantinople and Gallipoli were all, more or less severely, affected by it. At the same time too, the regiments which had been sent to the Piræus suffered a large amount of sickness and mortality. The evil effects of taking possession of old buildings, without due preliminary sanitary preparations, were experienced there as everywhere else.

It is estimated that the entire loss sustained by the French army in the East from cholera alone, during the months of July and August, amounted to between seven and eight thousand; upwards of five thousand having died on the spot, and the rest disabled by protracted illness, if indeed a large proportion of them did not subsequently sink under fever and other secondary diseases.

One pestilence had thus, in two short months, out of an army 55,000 strong, and before a shot had been fired, deprived France of as many men as were slain by the enemy in the field during the twelve months from the day of landing in the Crimea to the end of the siege by the capture of Sebastopol, and when the average strength of the army was nearly double the above number!

But besides cholera in July and August, other diseases, especially dysentery, typhoid and remittent fevers, had served to swell the sick-list. The total admissions into hospital in these two months amounted to nearly 10,000—or between a fifth and a sixth part of the whole force under arms.

That much of this sickness might have been avoided, had the men, both the sick and the well, been less crowded together, often too in unwholesome localities, and had more attention been paid from the first to the selection of places for hospitals and encampments, and if also the quality of the supplies—the food, drink and clothing—had been better and more suited to the wants of the troops and the circumstances of their varying condition, is distinctly asserted by all the French medical officers.

Before we pass on to a new field of observation and experience—from Turkey to the Crimea—the highly interesting and important question as to the probable origin or source of development of the pestilence, which had caused such havoc in the army, presents itself for our consideration. Did it spring up in the places where it appeared? or was it brought to and imported into these places, as has been asserted, from France or Algeria by the troops which were continually arriving from these countries, Turkey itself being previously free and intact? In a social as well as a military point of view, and as affecting the welfare of nations and communities not less than it may affect the movements of troops, and the general operations of war, the question is obviously one which demands special attention from our profession.

M. Scrive and the other medical officers present with the French army in Turkey when the cholera first appeared among the troops, and who could trace its progress step by step, are of opinion that the disease developed itself on the spot, and was not primarily introduced from without. Besides a general and increasing prevalence of *cholerine*, sporadic cases of the disease of the most malignant type had occurred both at Varna and on the Dardanelles before the arrival of any infected troops; and, indeed, the first manifestations of the cholera that year, 1854, were observed quite as early in Turkey as in France; viz., in the latter half of June. Towards the close of the previous year, too, it had existed in Bulgaria and other parts of the Turkish dominions, as well as the southern provinces of Russia, the Russian army in Bessarabia having suffered severely from it in the autumn of 1853.

These facts seem to show that the manifestation of the pestilence in the summer of 1854 was not dependent on the arrival of infected troops from France (as has been stated in some documents published in this country), but rather that it developed itself in its own mysterious way in the places where it appeared; although, doubtless, the continual influx of infected and highly predisposed troops served to aggravate the evil and greatly to increase the mortality, especially when sanitary precautions in the lodging and feeding of such troops were overlooked or neglected. I shall afterwards have occasion to revert to the influence of climate, season, and local conditions on the spread or otherwise, etc., of cholera as it was observed in the allied army in the East. The scene now changes.

It was on the 7th of September, that the allied fleets sailed from Balshik on the Bulgarian coast; on the 13th they anchored off Eupatoria. The next three days were spent in landing the troops. After halting for a couple of days, the combined armies advanced on the 19th, and next day fought the battle of the Alma. The French army, 23,000 strong on that occasion, had 300 killed and 900 wounded.

A few isolated cases of cholera had occurred during the voyage to Eupatoria; but, on the whole, the health of the troops was considered to be good on landing in the Crimea. The number of attacks of cholera increased very considerably immediately after the battle, in consequence chiefly, it was believed, of the armies halting, for two days, on the field where hundreds of putrid carcases of horses were scattered about, and the surface of which was moreover polluted with ordure from its occupation by the Russians. Other causes, however, had a share. The troops had undergone very great fatigue for several days under a hot sun, and with insufficient food, which moreover was not of first-rate quality. It deserves notice, as bearing on this subject, that at this time the officers suffered quite as much from cholera as the men; the rations of both were the same, and the former had, of course, no means of adding to or improving them. Throughout the campaign generally, however, the proportion of officers attacked by cholera was much less than that of the men;—their food and their accommodation were better.

In military and naval epidemiology, this point—the relative numbers of attacks and deaths among officers and men—should always be ascertained and stated. It is often highly suggestive.

During the march to the south side of Sebastopol, bowel complaints became more numerous, and a good many deaths from cholera took place. Among other victims, Marshal Arnaud was attacked at this time, and died a few days afterwards on shipboard. He had long suffered from disease of the heart. The want of water on the march was a source of intolerable distress to the poor sufferers.

In the month of October, the first of the memorable siege, the hospital admissions from disease alone (exclusive of gunshot wounds) amounted to not less than between a seventh and eighth part of the whole force, then about 46,000 in number. Nearly a fourth of the admissions were from cholera, and more than two-thirds of the deaths were caused by it. The newly-arrived troops suffered most. This was

invariably the case throughout the whole campaign. It is an important epidemiological fact in respect of cholera, as of yellow fever and other like diseases, that fresh comers into a locality or district where the pestilence exists, or has even just begun to manifest its existence, are much more liable to seizure than the residents. Hence doubtless, on many occasions, has arisen the idea of such persons having introduced a disease, merely from the circumstance of their being among the earliest victims.

The necessity for extra vigilance in the hygienic treatment of newly-arrived troops in a foreign climate is naturally suggested by this consideration.

Already traces of scurvy had become evident in the French army; it was often associated with diarrhœa and typhoid fever.

The rations were insufficient in quantity, and consisting, day after day, of the same salted indigestible meat, served to irritate the bowels, while they failed to nourish the system. "This was a serious state of things," says M. Scrive, "at a moment when the army had more than need of all its strength." Fortunately, the weather had hitherto been favourable, and the climate of the Crimea was anything but insalubrious.

In November the cholera subsided, but scorbutic diarrhœa and dysentery increased both in amount and in severity; and the death-rate to cases rapidly went up. Hitherto, wounds and operations had on the whole healed pretty favourably, but now they refused to unite. The total admissions, from wounds as well as diseases, this month amounted to a tenth part of the force in the field. Gunshot wounds occasioned only a fifth part of these admissions, although the sanguinary battle of Inkerman took place on the 5th (where the French had 300 killed and 600 wounded), and the siege works were being pushed on with great activity.

After the terrible storm on the 14th, the weather became more wintry, and the result was that a good many cases of frost-bite occurred in the latter half of the month. The men had only their miserable *tentes d'abri* for shelter, and their clothing was moreover quite insufficient for the season. The only two hospital huts in the army having been smashed by the storm, the whole of the sick and wounded were consequently in tents until some large hovels or *cubones* could be excavated in the ground and roofed over with the *débris* of the old huts and with earth, in order to receive the worst cases. These partially subterranean hovels cannot, of course,

ever be made or kept wholesome for hospital purposes. They afford the means of shelter against inclement weather;—that is all that can be said for them. The atmosphere within is necessarily impure.

In December, things were much the same as in November, only worse. Besides numerous cases of scurvy and frost-bite, a good deal of typhus had sprung up in the camp. Cholera, too, continued to appear occasionally among the new arrivals. The first wooden huts for hospitals sent from France were received this month. They were insufficiently ventilated, and not provided with flooring,—a defect which unfornately could not be supplied on the spot from want of materials.

The new year opened with sharper cold and ruder weather; but the men on duty were still without proper tents or suitable clothing, or even sufficient and right food to enable them to resist it. Not a few poor fellows were frozen to death. Between two and three thousand cases of severe frost-bite were received into the ambulances: in nearly half the cases, the loss of some member or extremity ensued. No fewer than 800 of these sufferers died, either in the camp, or subsequently at Constantinople.

The hospital admissions this month were higher than they had yet been. Nine thousand fresh cases were sent into the ambulances, and upwards of six thousand sick and wounded were shipped off to Constantinople—an aggregate of fully fifteen thousand sick out of a nominal force of 78,000 in the field. Vast numbers, moreover, who could not be received into hospital, were unfit for duty.

But the miseries of the troops had not yet reached their acme. February was still more disastrous in sufferings than January—sufferings arising from privations and neglect, and which might, therefore, have been in a great measure or altogether prevented. Scorbutic disease prevailed everywhere. Three thousand men were sent into hospital with it; but these were only the worst cases, for the whole army was at this time more or less deeply tainted. And no wonder. Fresh vegetables had never been served out, and the wild *taraxacum*, which the men had been told to gather for themselves to make a salad, was now not to be had! Neither lemon-juice nor vinegar seems to have been supplied to the French troops at any time throughout the campaign.

Typhus had increased considerably this month in the camp, and it was spreading in the hospitals to other patients and to the attendants. Several of the medical officers died

of it. As may be anticipated, wounds at this time would not heal, and a good many cases of hospital gangrene occurred. "Nous sommes fort mals à tous les points de vue" are the expressive words of the principal medical officer in his report at this dismal period.

The more favourable weather in March allowed a general cleansing and purification of the camp to be begun. The tents, and more especially the hospital ones, were pitched on fresh sites, and they were directed not to be dug or hollowed out as they had been during the winter, and also to be more thoroughly ventilated. Chloride of lime was to be occasionally sprinkled on the earth floors. The heaps of filth and rubbish were burned, or, when that could not be done, a strong solution of sulphate of iron was spread upon them;—the same application was used to deodorise the latrines. Carcases of horses, etc. were buried a couple of feet below the surface, and covered with a layer of quick lime. Charcoal is not mentioned among the disinfectants used. The medical officers urged the paramount necessity of fresh meat and vegetables being provided for the troops; and meanwhile, the men were recommended to recommence getting all the *taraxacum* they could find—a poor substitute, it must be confessed, for regular supplies of potatoes or onions.

In April, these various sanitary measures were carried out more efficiently, and the health of the troops certainly improved. Still, there was a large amount of scurvy and also of typhus fever in the camp. Both these formidable maladies, however, were now sensibly on the decline. Cholera, which had all but ceased in March, increased somewhat in April. It was not till the beginning of the following month that the increase was considerable; but then the progress of the disease steadily and rapidly advanced. Large reinforcements were continually arriving at this time, and it was among these, as usual, that most of the cases occurred. The Imperial Guard, which had been stationed for some weeks at Constantinople, and where they were suffering severely at the time from the pestilence, were among the arrivals in May. Although they were still affected with it on leaving the Bosphorus, and although the disease existed also around Sebastopol when they landed at Kamiesch, the change to the Crimea proved beneficial. The cholera abated, and the general health of the men improved, while the strength of the besieging army was greatly enhanced by these choice troops. Care was taken that their tents were pitched well

apart from each other, kept thoroughly ventilated, and not crowded.

Great praise, it seems to me, is due to M. Scrive for the judgment he showed in the whole business. He had been consulted by General Canrobert as to the propriety of moving up the Imperial Guard from Constantinople, while they were still under the influence of cholera. On a due consideration of all the circumstances, M. Scrive thought that they might be so advantageously, provided proper precautions were taken. The result proved the wisdom of his advice, and may be fairly quoted as one out of many instances of the value of enlightened medical opinion in the operations of a campaign.

The irregularly erratic—one might almost say, the capricious—course and movements of the cholera in the camp might find an analogy in those of a blight in the vegetable world, or in the wanderings to and fro of insect swarms over a district, but were quite inexplicable on any hypothesis of contagious transmission, or of a generally and uniformly-diffused atmospheric contamination. The disease did not appear simultaneously in the two great divisions of the French army forming the left and the right attacks, but rather in succession in the one after the other. The second *corps d'armée*, operating against the Mamelon and Malakoff, suffered first; and it was not till a week or two later that the other *corps d'armée* at the extreme left began to be affected. One division of this latter corps, which formed part of the expedition to Kertch at this period, and which apppeared to be free from the disease when it sailed from Kamiesch on the 22nd of May, was attacked a few days after landing at Kertch, and therefore about the very same time as their comrades before Sebastopol.

About the end of this month, the sick list was swelled by a good many cases of intermittent fever, occurring chiefly among the troops which had taken possession of the marshy flat of the Tchernaya (recently evacuated by the Russians), or among the soldiers who had had the disease at Rome or in Algeria. Remittent fever, also, became more rife with the increased heats of summer; nor was typhus quite extinct in the hospitals, for more than one medical officer fell a victim to it in May.

June proved to be a very sickly, as well as a very sanguinary, month. Out of a force estimated at 122,000 men, little short of a sixth part was sent into hospital by disease and by gunshot wounds. The admissions from the casualties of war, compared with those from zymotic disease, were in

the proportion of one from the former to between three or four from the latter; although the fierce actions on the 6th, when the Mamelon was taken, and on the 18th, when the unsuccessful attack was made upon the Malakoff, took place this month.

Cholera, which reached its acme in June, occasioned about a third part of the whole sickness; choleraic diarrhœa, dysentery, and malarial fever made up the rest. The weather was at times extremely hot, and there were occasionally heavy rains. As the siege-works were being pushed forward with great energy, the fatigue work of the trenches told, of course, also upon the health of the men.

These circumstances may explain, in part at least, the large amount of sickness from the diseases just enumerated, but will not prepare us for the re-appearance—or rather the increase—of scurvy at this season in the French army. The supply of fresh vegetables had as yet never exceeded a very scanty and irregular allowance; and now the summer heat, we are told, had withered up all the dandelion which for the last two or three months the poor fellows had been able to collect for themselves!

July brought an abatement of cholera; but malarial fevers and dysentery were very prevalent. Scurvy, too, was on the increase. Twelve hundred men were sent by it into the ambulances—as many as by cholera. But the mere number of admissions into hospital affords no idea of the extent of the former disease. "All our old soldiers, those who had been out since the beginning of the year, are more or less scorbutic," writes M. Scrive at this date.

In August, the number of fresh cases of scurvy taken into hospital was double that in July. Cholera had much declined; but bowel-complaints were still extremely rife. These, along with malarial fevers, caused the great bulk of the sickness. Altogether, the health of the French army was at this time anything but satisfactory. Between ten and eleven thousand sick and wounded were shipped off to Constantinople in the course of the month, and nearly sixteen thousand fresh admissions into the camp ambulances took place. In the battle of the Tchernaya, on the 16th, the French had 300 killed, and 800 wounded.

We come now to the crowning event of the campaign in a military point of view:—would that we could say, in a medical point of view likewise. But, alas! there is often no parallelism or synchronism between the successes and disasters of war in these two aspects.

On the 8th of September, Sebastopol fell by the glorious atchievement of the capture of the Malakoff by the French troops. Their wounded that day amounted to between 4000 and 5000. More than 500 wounded Russians were also received into their hospitals.

As there were fully 5000 sick and wounded in the ambulances at the time, hospital accommodation for upwards of 10,000 patients was at once required. Unfortunately, this did not exist; and the result was, that the huts and tents were excessively crowded; and hospital gangrene—the typhus of wounds—which had for months occurred only in isolated cases in the camp, speedily became frequent in every ambulance. Scurvy, too, continued to add a large quota to the sick list; and cholera had not ceased to attack, although not to a great extent, the young recruits soon after landing.

On the whole, however, there was less fresh sickness in September than in August, owing doubtless, in a great measure, to the heats of summer having given way to more cool and agreeable weather. The favourable change continued throughout October, and disease still further declined. Fresh cases of scurvy, although much less numerous than in the preceding month, were still far from being infrequent; and cholera still lingered in the camp, but with diminished power.

As from this period cholera ceased to play an important part in the sickness of the French army, it will be convenient here to state the general conclusions which M. Scrive formed respecting its character as it was seen in the Crimea. Since the day of the landing at Eupatoria, it had never been entirely absent from the French army; and yet at no time, not even in May or June, could it be said to prevail as an absolute epidemic in the camp. It certainly never acquired the force of a pestilence, as it did in the Dobrudscha; and it was always possible, by the adoption of sanitary precautions, to attenuate and mitigate its malignancy, and greatly to limit its extension. On all occasions its chief stress fell upon new comers: there was no exception to this law—for so it may be called—among the successive arrivals of the 250,000 French troops which at one time or another landed in the Crimea.

Notwithstanding the almost constant arriving of infected ships and men at Kamiesch, the disease never spread among the resident population of that place; and we have seen that, on various occasions, troops which landed with the disease among them seemed to get rid of it soon after they were spread about in their encampments in the front.

The experience of the British medical officers coincided with that of their French brethren. At Balaklava (and also at Malta), as at Kamiesch, the disease at no time spread on shore, although transports and other vessels were continually coming in with cases on board, and although many of the ships that were lying nearest to the foul margin of the harbour did not escape.

In the British camp, too, the existence of the cholera in one regiment or body of men never seemed to be the cause, or operating agency, by itself of its development among another regiment encamped near it. But the favouring influences of recent arrival, local insalubrities, and dietetic and regiminal irregularities were strikingly conspicuous on every occasion. M. Scrive's observations led him to a like result. It may be impossible, he truly remarks, to predict with any accuracy *where* or *when* the disease will fall or strike; but the circumstances which give force to the blow, and those which will mitigate it, are certainly known to us.

He considers that the emanations from the dejections of cholera patients, when many are treated together, may greatly favour the extension of the disease in hospitals, unless the most thorough ventilation be kept up.

The average duration of the outbreaks of cholera, among the French troops in the East, varied from two or three to five or six weeks. An invasion usually took from eight to fifteen days to reach its maximum force; and about the same time was spent in its decline. The disease never terminated abruptly, or all at once; but it kept lingering about for some time, often unexpectedly making itself felt in places which it had hitherto unaccountably spared; at other times, re-appearing in spots which it had already visited, and which it was believed that it had left. This feature of seeming capriciousness in its movements is not peculiar to cholera. Other epidemic diseases often exhibit the same character.

The tendency to secondary fever (which very generally proved fatal) was always observed to be greater during the decline, than during the rise and increase, of an epidemic invasion. In the Crimea, most of the fatal cases of cholera terminated in this way.

Rather more than six thousand deaths occurred from cholera among the French troops in the Crimea from September 1854 to December 1855. The number of cases had been between twelve and thirteen thousand. The proportion of attacks to the strength of the army in the field was greatest in October and November of the first year, and in June and

July of the second. It was lowest in March and December of 1855.

The recent arrival of the troops in the autumn of 1854, and the arrival of immense reinforcements in the latter part of the spring of 1855, in connection with the increased heat on the approach of the summer, had much to do with the greater prevalence of the disease on both occasions.

But to return to the course of our narrative. The commencing rude weather, in November 1855, found the French army almost as unprepared for encountering another winter on the bleak heights of the Crimea as it had been in the previous year, and its aggregate number was now nearly twice as great. The medical staff were, therefore, full of apprehensions at the prospect, knowing as they well did the cachectic condition of the troops generally, and the utter insufficiency of the means for the proper shelter and care of the sick and wounded. Large numbers of these poor fellows were still lying on the ground under canvas, often without any means of artificial warmth; nor was there the hope of better protection throughout the whole winter. If such was the condition of the invalids, it need scarcely be said that that of the men on duty was not better. They were huddled together in tents which did not exclude the rain, or in mud hovels deeply imbedded in the ground for the sake of better shelter, and kept close and unventilated to exclude the cold air. Besides this prolific source of unwholesomeness, the earth floors of these wretched abodes soon became polluted from various causes. All the fuel for cooking had to be cut down and brought from a distance; and as the extent of the line of defence which our allies undertook to occupy was very great, extending nearly from Baidar to Kamiesh, the strength of the French soldiers was then far more taxed than that of the British troops, while their condition in every respect as to shelter, food, and clothing, was infinitely worse. No one who witnessed the state of the French camps that winter can forget their thorough wretchedness everywhere. To me it is one of the most painful reminiscences of the field, only surpassed by the simultaneous horrors of the hospitals at Constantinople.

M. Baudens, who had been sent out from France to examine and report to the Emperor the state and the requirements of the army at this time, found, he says, the constitution of most of the old campaigners "used up" (*usure complet*), while that of the young recruits was in general extremely feeble; and then there was, he adds, no longer

the excitement of the siege to "galvanize the courage of the soldiers."

With the greater inclemency of the weather in December, the number of the sick, as well as the gravity of their ailments, much increased. Thirteen thousand fresh cases of disease were sent into the hospitals in the camp during the month, and between four and five thousand invalids were sent down to Constantinople. Besides numerous bronchial and pulmonary attacks, disorders of the bowels had advanced both in frequency and severity, and formed the predominant cause of sickness in the army. The cold of winter seemed to aggravate this class of diseases as much as the heats of summer.

Scurvy, too, was on the increase, as was to be expected from the cold damp weather and the insufficient supply of fresh vegetable food. And now another terrible enemy began to raise its head. Typhus, which in the winter of 1854 had occurred but to a very limited extent, was much more prevalent than it had yet been in the camp; and it was, moreover, evidently spreading both in the regimental tents and cabanes among the men on duty, and also among the inmates and attendants of the ambulances. No one could wonder at this; every medical man foresaw the storm. The enemy was the very same that used to spring up in all the old dens of our prisons, and has ever proved the worst scourge of foul and crowded hospitals, and which, therefore, received the very appropriate appellation of "*jail*" or "*hospital*" fever.

The self-multiplying and propagating property of the engendered venom adds terribly to its power. So it proved in the French army. Each victim poisoned others near him; and soon it became impossible to determine what cases were of spontaneous development, and what were the results of contagious transmission. Curative medicine was, of course, at an end; nor could almost anything be done in the way of even mitigating the disaster, in the destitute condition of the troops in mid-winter. There were no means of segregating or dispersing the sick, nor of finding better accommodation for any of the troops, whether sick or well; and the hospital difficulties were still further increased by the fewer opportunities of sending off the sick to Constantinople,—at first, in consequence of the inclement weather, and at a later period, from the hospitals there becoming from mismanagement pest-houses of the worst description.

From week to week things rapidly became worse and

worse. In January, there was double the number of new cases of disease that occurred in December; and February surpassed its predecessor in suffering and death. Seven-and-twenty thousand fresh sick were crammed into the ambulances during these two months. The increase both of typhus and of scurvy had become, says M. Scrive, truly awful; "it was the most terrible disaster of the whole campaign." Many of the medical officers fell victims to the fever, against whose ravages among their patients they could do nothing but look on in despair.

It is estimated that, from December 1855 to the following March, between nineteen and twenty thousand cases of typhus occurred among the French troops in the Crimea, and that nearly one half the attacked died on the spot. Among the victims were thirty-one of the medical officers, of whom seventy-five were attacked. During this period, too, upwards of 28,000 sick from other diseases were (we cannot say treated, but) sent into hospital, and of this number, about 7000, or a fourth part, perished. Moreover, between 27,000 and 28,000 had in the same interval been sent off to the hospitals at Constantinople. Of these, many thousands died either on board the transports, or soon after their arrival.

It is unnecessary to follow the medical history of the French army in the Crimea for the few remaining months after the conclusion of peace at the end of March, 1856. By the shifting of the different camping grounds, the emptying and purification of the foul abodes of the well and the sick, and the greater dispersion and better accommodation which could then be procured, as well as by the increased supplies of fresh food, the amount of disease and death rapidly subsided.

It was, indeed, high time; for it is believed, that the army could not muster for effective duty more than one-half its nominal strength—a state of things nearly as bad as that of the British force sixteen months before, when the terrible hardships of the trenches were superadded to the disastrous results of insufficient clothing, food, and shelter. How different now, when not above six or seven per cent. of the British army were off duty, and slight bronchial affections formed a principal part of the sickness. The Sardinian army was very much better conditioned and cared for than the French, and suffered proportionately less from disease this winter. Their state, however, was far from being equal to that of our countrymen. Typhus and scurvy continued to exist to a consi-

derable extent. Their damp ill-ventilated dab-and-wattle huts, partially imbedded in the ground, however neat and snug to the eye, could not be so wholesome as was desirable; and their hospital huts, although most substantially constructed and well provided, were not half so well aerated as those in the British camp.

But it was not in the Crimea alone that the pestilence of typhus committed such dreadful ravages among the French during the winter of 1855-6. In consequence of the large drafts of sick and disabled continually being sent down from the camp to Constantinople, the hospitals there had become crowded to overflowing; and this, too, without the adoption of anything like the needful hygienic precautions. Not only was the ventilation of these buildings most imperfect, but their atmosphere was still further polluted with foul emanations from both within and without. The consequence was, that they very soon became breeding-places as well as reception-houses of disease. Typhus rapidly multiplied itself by the double process of spontaneous development and infectious multiplication. Vast numbers of the sick admitted with other maladies, as well as of the wounded, caught the fever and died; and few of the attendants, nurses, and orderlies escaped. Many of the medical officers perished.

In the first three months of 1856, upwards of 53,000 patients were (as appears from an official return given by Dr. Bryce in his able and instructive work, *England and France before Sebastopol*) treated in the French hospitals in and around Constantinople. Considerably more than a third part of the number perished—a terrible death-rate, certainly. Typhus was the chief destroyer; its coadjutors being scurvy, dysentery, hospital gangrene, and frost-bites. What proportion of this great mortality was fairly attributable to the gravity of the cases when the sick were landed from the crowded transports and first received into the hospitals on shore, and what proportion may be ascribed to the baneful effects of the poisoned atmosphere of these buildings, and to the diseases engendered, aggravated and multiplied thereby, it is not possible, of course, to decide with any precision. But the experience of our own hospitals at Scutari, in which the death-rate to cases treated during the first three months of 1855 was about nearly the same as it was in the French hospitals at Constantinople during the first three months of 1856, and where it afterwards fell so rapidly upon the carrying out of the required sanitary improvements, warrants us in saying that the mortality from the latter cause far, very far, exceeded that from the former—probably two or three times at least.

In narrating the medical history of the army in the camp during the winter of 1855-6, M. Scrive expresses his grief and astonishment to his countrymen that, in the present day, their brave soldiers should continue to suffer such a disastrous amount of sickness and death after all the experience of former wars, which have invariably told the same dismal tale, viz., that three-fourths, at the very least, of the losses of an army in the field are, not from the fire or sword of the enemy, or from any other unavoidable casualties of active service, but from certain perfectly well-known diseases, which are all, more or less, under immediate control, and which may therefore be in a very great measure, if not altogether, avoided. Of these, typhus and scurvy are two of the most formidable, as well as the most easily preventable. They are the inevitable products of certain well-ascertained conditions, and they may be generated at will as surely as any salt or other compound may be formed by the chemist in his laboratory. And yet it was these very two evils which, two short years ago, brought the noble army of a mighty nation, at the close, too, of a glorious campaign, to almost the verge of destruction.

That the French medical staff in the camp deserved no share of the blame in this matter must be patent to all who will read the simple narrative of events as given by M. Scrive; their urgent and repeated warnings and remonstrances were without avail, and when the storm came, they were left without resources. Can the same be said, or the same excuse be alleged, for their brethren at the Constantinople hospitals, in reference to the frightful mortality which occurred in them, and which equalled, if it did not exceed, that in the camp with all its miseries and destitution? I fear not; for however hampered and shackled the medical officers of the French army appear to be, and however dependent they are made on other departments for the equipment and management of hospital establishments, one cannot but believe that much might have been done by those gentlemen to diminish, if not to correct, the enormous sanitary evils which produced such disastrous results. The worst of those evils unquestionably was the excessive crowding without previously securing a corresponding increase of ventilation—and of ventilation, too, so arranged, *that fresh, pure air should reach every inmate, and that the vitiated respired*

air of all should be carried off continuously, by night and by day. Unless this most essential of all requirements is invariably and unceasingly provided, nothing but mischief must ensue. Far better that the sick, and especially the sick from fever, should be scattered about in large courtyards, or upon any open clean and dry ground, and be put under canvas or any sort of shelter, however imperfect, and with the want of every comfort around them, than that they should ever be accumulated within a building where there is not an adequate amount of space for each inmate, or where a pure atmosphere cannot be maintained by the constant renewal of unpolluted air at all times in the four-and-twenty hours. Nothing will compensate for the want of this prime necessary, which, thanks to an ever-beneficent Providence, may always and everywhere be had, while with it the value of every other curative agency or influence will be tenfold enhanced.

The following is a brief summary of the number of admissions into hospital, and of the deaths from all causes in the French army during the twenty months from landing in the Crimea to the conclusion of hostilities. The figures, especially as regards the loss of life, are probably much below the truth; but they serve, on the whole, to bring out some highly interesting and instructive conclusions.

Out of a force which averaged, during the above time, nearly 104,000, upwards of 193,000 men were sent into hospital—or from nine to ten thousand a month. Between a fourth and a fifth part of the whole admissions arose from gunshot wounds and other accidents or mechanical injuries. The rest were caused by disease. Of the 193,000 sick and wounded, about 115,000 were sent down to the hospitals at Constantinople; so that rather more than 78,000 were treated in the camp ambulances.

The mortality in the field stood thus:—Exclusive of 7500 slain in action, 28,400 died in hospital, or considerably more than a third part of those treated. Of these 28,400 deaths, about 4000, or a seventh part of the whole, arose from gunshot wounds and accidents, leaving fully six-sevenths of the whole mortality in the ambulances as the result of disease. Many of the deaths, moreover, among the wounded were caused by diseases caught in hospital.

The deaths in the hospitals at Constantinople, during the same period, amounted to nearly 28,000; the mortality in them being, therefore, only a trifle under that in the field ambulances.

As the entire number of deaths resulting from gunshot wounds and other accidents during the whole period of the twenty months is set down at 8500, out of an aggregate of 43,250 cases, there must have been about 4500 deaths from this cause in the hospitals on the Bosphorus, or between a sixth and a seventh part of the whole mortality there; it being always kept in mind that a large proportion of the deaths among the wounded were due to fever and hospital gangrene.

After the details which have been given in the preceding narrative, it seems scarcely necessary to attempt to particularise the relative amounts of sickness and mortality caused by different special diseases among the French army in the Crimea, especially as in a very large proportion of the cases, different morbid states or elements were blended and associated together, springing as they did from the same or similar causes.

To the above aggregate number of deaths from disease and wounds in the field and in the hospitals at Constantinople, must be added those which occurred on board transports between Kamiesch and the Bosphorus, or between the Bosphorus and France. These are not given in the French returns hitherto published. They must have amounted to several thousands.

Finally, it may be mentioned that, besides the total loss of life from all causes, and during the entire period of the campaign in the East, estimated in the official returns at nearly 70,000 (but which there is every reason to believe was greater by 8000 or 10,000 at least); 65,000 men out of the 309,268 sent from France and Algeria to the seat of war, were invalided in consequence of disablement from wounds or the effects of disease.

Such, then, are some of the fruits of War, even to a victorious army, in the latter half of the nineteenth century!

THE

HEALTH OF THE ROYAL NAVY CONSIDERED,

IN

A LETTER

ADDRESSED TO THE

RT. HON. SIR JOHN S. PAKINGTON, BART.,
G.C.B., M.P.,

BY

GAVIN MILROY, M.D., F.R.C.P.,

MEDICAL INSPECTOR UNDER THE GENERAL BOARD OF HEALTH FROM 1849 TO 1854; MEDICAL COMMISSIONER TO JAMAICA IN 1851; AND MEMBER OF THE SANITARY COMMISSION TO THE ARMY IN THE EAST IN 1855-56.

"I conceive it to be the duty of every educated person to closely watch and study the time in which he lives, and, as far as in him lies, to add his humble mite of individual exertion to further the accomplishment of what he believes Divine Providence to have ordained."—*Speech of the Prince Consort in the City*, 1850.

"It is only by clearly and distinctly pointing out the causes which affect health that we can hope to avert disease, and reduce the rate of mortality in the Naval service."—*Statistical Return of the Health of the Royal Navy for the year* 1858.

LONDON:
ROBERT HARDWICKE, 192 PICCADILLY.
1862.

Price, Two Shillings.

T. RICHARDS, 37, QUEEN STREET, W.C.

TO THE RIGHT HONOURABLE

SIR JOHN S. PAKINGTON, BART., M.P.

SIR,

The active interest you evinced when First Lord of the Admiralty in all that concerns the thorough efficiency of the Navy — in regard, not only of the ships, their armaments and supplies, but also, and not less, of the hands which are to wield them— leads me to address the following observations to you, in the hope that they may thus possibly attract the notice of others besides the members of my own profession. Far too important is the subject to need any apology for seeking to bring it under the attention of all officers, the administrative and executive as well as the medical officers, of the service, and indeed of the public generally. It is now admitted, on all hands, that the strength and virtual efficiency of an armed force, whether afloat or on shore, is to be measured, not by the mere number of the names on the ship or regimental roll, however complete may be all the material equipments of the force, but really and truly by the actual number of hearty vigorous men who are, from day to day and from month to month, continuously available for fatigue duties of all sorts. Every man put on the doctor's list is so much power withdrawn from the full effectiveness of the living machine. Nay, it is more than this, for each such

loss forthwith becomes the occasion of extra duty being cast upon the well men to supply the void; and then, too, there is the time and labour of those who have to act as the attendants upon the sick to be taken into account. These consequences become a serious matter when sickness prevails to any considerable extent among a ship's crew. The energies of the well men are overtaxed, their hours of meal-time and sleep are interfered with, continued extra fatigue creates weariness and discontent; and this is the very state of system in which the health is liable to suffer from influences which it has hitherto resisted. Sickness thus gives rise to sickness in more ways than one; and this, too, is apt to go on in a progressively increasing ratio. Obviously, therefore, the necessity of averting or preventing to the utmost all disease, and of preserving as far as can be done uninterrupted health among a ship's crew, cannot be overestimated as one of the main objects to be aimed at by all who have at heart the duty of maintaining a powerful Navy, ready at all times for the defence and honour of our country. And the importance of the subject is yearly becoming greater, from the acknowledged difficulty that has often been experienced in recent times of promptly manning a large fleet upon an emergency, in consequence of the enormous demands of our mercantile marine for able-bodied hands in these days of increasing commercial activity.

My attention having been drawn, at various periods of my professional life, to the state of health of seamen, and specially on two occasions of official employment in the West Indies, and in the Black

Sea and Mediterranean,* along with numerous opportunities of converse with naval officers both at home and abroad, will plead my excuse for taking upon me, though not belonging to the service, the task of inviting public notice to the subject; and the extended inquiries which I have recently conducted into the general operation of quarantine have also brought to my knowledge much valuable information on the hygienic condition of ships, both of the royal and of the mercantile marine of different countries.† The very unconnectedness of my position may possibly not be without some advantage; but be that as it may, the truth and fairness of the following statements must be the best test of their value or otherwise.

Before proceeding to treat of the existing state of health of the Royal Navy, which is the special object of this letter, it will not be amiss to glance at its condition in the early part of the present century.

After the close of the great continental war, the distinguished veteran Sir Gilbert Blane, long one of the most eminent medical officers in the service, published his dissertation "On the Comparative Health of the British Navy, from the year 1779 to the year

* Report made by Dr. Milroy to the Colonial Office, on the Cholera Epidemic in Jamaica in 1850-51, &c. *Printed by order of the House of Commons*, May 1854.

Report to the Minister of War of the Proceedings of the Sanitary Commission, dispatched to the seat of War in the East, 1855-56. *Presented to Parliament*, March 1857.

† Papers relating to the Laws and Practice of Quarantine in Foreign Ports and in British Colonies, prepared by a Committee of the National Association for the Promotion of Social Science, and communicated to the Board of Trade. *Printed by order of the House of Commons*, Aug. 1860, and August 1861.

1814, with proposals for its farther improvement." He there pointed out the immense saving of health and life in ships of war that had been effected during his time, in consequence of successive ameliorations in the construction and sanitary arrangements of the vessels, and in the general condition and care of the men. For the last three years of the war, the annual death-rate from all causes throughout the different fleets he reckoned to average about 33 per 1000 of the entire strength, the aggregate of which for each year being put down at nearly 138,000 of all ranks and ratings—an enormous force certainly, in the gathering together of which but little attention could possibly have been paid in the selection of lives, more especially at a time when impressment was in vogue. Thirty years previously, the ratio of mortality had been far more than double, probably two-thirds, this proportion. Nor will this be wondered at when it is known that at that time ships were often like the then jails and prisons, with their holds so foul and noisome that "the air used to become so contaminated as in innumerable instances to produce instantaneous and irremediable suffocation";—and when the newly raised men were so huddled together on board filthy receiving vessels that fever was never absent from them, and numbers were cut off before they were even distributed among the ships of war, while hundreds perished of the same disease and of putrid flux before they had been many months at sea. Sailors died off in those days at a greater rate than even the troops, miserably bad as the condition of the latter was. Scurvy was then, from the bad provisions served out to the men, a

desolating scourge to the Navy; and such continued to be the case down to 1796-7, when lemon-juice was first regularly supplied to our ships of war, and the diet of the crews was improved. Yet twenty years before that time, Captain Cook had convincingly shown not only how this disease may be prevented, but also how, by the simple expedient of furnishing wholesome and suitable provisions and pure water, and by unremitting attention to the thorough cleansing and ventilation of a ship, the health of her crew may be so preserved that, in a three years voyage round the world, out of a company of one hundred and twelve men, but five in all should be lost—four from accidents, and one only from disease. Sanitary practice then, as now, advanced but slowly long after its benefits were demonstrated.

As scurvy was got rid of by improving the diet of the men, so fevers and fluxes were, if not got rid of, immensely kept down when ships were kept clean and better aired in every part, and when the crews were better treated and cared for in respect of their accommodation, clothing, and medical supplies.

By the great reduction in the death-rate of the Navy at the close of the continental war, compared with what it had been at its commencement, it was estimated that "two ships of war are now (1815) capable of more service than three of the same rate in former times"; in other words, one-third had thus been added to the effective force, and moreover an enormous expense, inevitably consequent on sickness and death, had been saved. Still the ratio of mortality in the Navy was justly considered by Sir Gilbert Blane as excessive; from disease alone, and

exclusive of all losses from accidents, drowning, and the casualties of war, it was in his opinion nearly double that among persons of the same ages in civil life. In his day, and for a good many years afterwards, there did not exist the means of determining with sufficient accuracy the vital statistics either of our general population or of the Navy. It was not till 1837 that the Registrar-General's department was instituted; and about the same time the Government first recognised the necessity of digesting and tabulating the returns of sickness and mortality in the two public services. The first issue of the statistical reports of the health of the Navy was in 1840; they embraced a period of seven years, commencing with the year 1830. Subsequently, but at long intervals, other reports for the septenniad from 1837 to 1843 were published. These bulky and unreadable Blue Books have of recent years been superseded by annual reports, which are infinitely more useful and instructive. The change was introduced after the late Russian war, and great praise is certainly due to the medical department of the service, and especially to Dr. Bryson, for the ability with which they are prepared. "The Medical Statistical Returns of the Baltic and Black Sea Fleets during 1854 and 1855" were issued in the early part of 1857; and these were followed by the "Statistical Reports of the Health of the Navy" for the year 1856, in the summer of 1858; for the year 1857 in 1859; and for the year 1858 in the spring of 1861.* It is from these more recent documents that the facts and data in the following

* The report for 1859 will, it is understood, shortly appear.

pages are mostly derived, and on which any opinions that may be expressed will be chiefly based.

The first point to be ascertained is, of course, what is the ordinary

Rate of Sickness in the Navy.

It may be necessary to premise that 1856 was nearly a year of peace; for, although the Russian war was not completely over till the early part of the spring, our fleet was not engaged in any hostile operations, at any time, either in the Black Sea or the Baltic; and it was not till the very close of the year that hostilities broke out in the Canton river. In 1857, our differences with China required a considerable increase to be made in the naval force on that station; most of the ships were long anchored in the Canton river, and their crews were much exposed to the malarious influence of its shores, besides having frequent sharp encounters with the enemy. The fleet of mandarin war-junks was destroyed on the 1st of June. On the 28th of December, the city of Canton was attacked; and next day, the walls were scaled, and the city and adjacent heights were taken. This year, too, the great Sepoy revolt took place, and the Naval Brigade, formed by detachments from the *Shannon* and the *Pearl*, joined the military force before Lucknow.

In 1858, the East India and China squadron was still further increased, and was actively engaged throughout the whole year both against the Chinese, and against the Indian mutineers. Three battalions of marines were for several months quartered in and around Canton, and had most severe and harassing

duties to perform in that unhealthy climate. The expedition against Tien-tsin on the Peiho took place in May; the defences in the river were taken by assault on the 20th, and the town was captured on the 26th of that month. The active aid given by the Naval Brigade in India is well known.

In 1856, when the aggregate mean force of the Navy was 51,730, the average number of men daily on the sick-list throughout the service was 3,132, or in the proportion of sixty-two men in every thousand; in other words, a seventeenth part of the whole force was continually off duty from the effects of sickness or injury, either on board ship or in hospitals on shore.

In 1857, the daily sick-rate was very nearly the same, being only a fraction less. The aggregate force that year was 42,470.

In 1858, the rate was higher, being in the proportion of sixty-six sick men in every thousand. The number at all times ineffective, out of a total force of 43,120, averaged 2,859, or about one in every fifteen men.

The sick-rate varies much, of course, in the different fleets into which our Navy is distributed, according to the stations where they are employed, viz.:—the Home, the Mediterranean, the North American and West Indian, the Brazilian, the Pacific, the West African, the Cape of Good Hope, the Australian, and the East Indian and China. To these nine fleets must be added the Irregular force, engaged on various stations, as the exigencies of the service require.

The amount of sickness is usually lower in the

Home, the Mediterranean, the Pacific, and the Australian stations than in the other fleets; but the rates vary so much in nearly all of them, from year to year, that no very positive or uniform statement can be made on this head. One year the North American and West Indian squadron is very healthy, the next year it is extremely sickly. The same thing may be said of the Brazilian squadron of recent years; formerly, it was invariably one of the most healthy. Two only of the fleets uniformly exhibit a high rate of sickliness, namely, that on the West Coast of Africa, and still more that on the East India and China station, which of late years has always stood highest on the list. The Irregular force also generally exhibits an unfavourable return.

The following table shows the mean strength and the average sickness-rate of the different fleets for the three years 1856, '57, and '58, taken together, and will suffice to give a pretty fair idea of the relative importance both as to numbers and the comparative healthiness of our naval forces employed in different parts of the world, however much the exact numbers, etc., vary from one year to another.

FLEETS.	Mean strength for the three years.	Average daily Sick-rate for the three years.
East Indian and China	7263	93 per 1000 men.
Irregular	7117	69 „ „
West Coast of Africa	1707	68 „ „
Cape of Good Hope	1030	59 „ „
North America and West Indies	4365	58 „ „
East Coast of South America	1323	55 „ „
Pacific	2387	53 „ „
Mediterranean	7867	52 „ „
Home	11,814	50 „ „
Australian	437	46 „ „

The number of days spent in the course of the twelvemonths on the sick-list, either on board ship or in hospital on shore, affords another means of showing approximately the loss of effective service on each of the various stations, and also over the entire aggregate force. Without going into details, it will be sufficient to state that in 1856 the total number of days' sickness throughout the Navy was such as to give twenty-two days off duty to each man employed; that in 1857, the proportion was a trifle more; and that in 1858 it was still higher, being rather more than twenty-four days on the sick-list to each man.

From the sick-rate, or amount of constant temporary loss of effective strength arising from disease or injury, I now pass on to note the amount of the permanent losses caused by death and by invaliding.

The Rate of Mortality in the Navy.

This varies, as might be expected, very considerably in different years, not only on separate stations, but throughout the service generally; and this, too, quite independently of the casualties of war and of all other accidents, including drowning, to which seamen are specially exposed.

In 1856 the general death-rate from all causes was 15·5 in every thousand men. In 1857 the proportion was 22 per thousand; and in 1858 it was 25·8, or nearly 26, per thousand. As these rates include the deaths from violence and drowning, as well as those from sickness, it will be better for the present to leave the former out of consideration, and attend only to the amount of mortality from the effects of disease, as a better standard will thus be

afforded for comparing the health of the Navy with that of other bodies of men about the same period of life.

In 1856, the deaths *from disease alone*, throughout the service, were in the proportion of 12.1 in every thousand of the force; in 1857, it was in the proportion of 14·7; and in 1858, it was in the proportion of 20·2. The general average for the three years was therefore between 15 and 16 per thousand men. From the following table, which gives the mean total and the disease death-rate for the three years, the reader will be able to judge of the relative fatality of the different stations on which our ships of war are engaged.

STATIONS.	Mean Death-rate for the three years.	
	From Disease alone.	From all causes.
Home	7·8	10·3
Mediterranean	8·4	11·6
North America and West Indies	19·8	24·
Brazilian	21·	25·2
Pacific	6·9	8·7
West African	14·3	20·5
Cape of Good Hope	10·2	16·3
East Indian and China	37·7	47·6
Australia	3·6	9·9
Irregular	8·3	12·4

The extremely high death-rate of the East Indian fleet will be noticed. It has been seen that two of the three years were years of war, both in China and in the East Indies. In 1856, the death-rate was only 27 per thousand from disease, and 34 from all causes. In 1858, it was 51·9 from disease, and 62·5 from all causes.

The Rate of Invaliding in the Navy.

The other cause of permanent loss to the service, from year to year, is the discharge of all the men who are hopelessly unfit for future duty in consequence of grave organic disease, or of some incurable infirmity.

In civil life, the annual death-rate is our only available test in estimating the healthiness, or otherwise, of the community, or of any large portion of the community. No means, as yet, exist for ascertaining, as in our army and navy, the Statistics of Sickness among the population of our towns and rural districts. And as to any elimination of invalids among civilians, the only discharge of them is by death. This circumstance alone presents a marked difference in the elements of any comparison instituted between the ratio of mortality in naval and military life on the one hand, and among working-men of the same ages in civil life, on the other; greatly, of course, to the advantage of the former by so many incurable sailors and soldiers having been discharged, and whose deaths on shore go to swell the mortuary returns of the latter.* What addition should be

* Keeping this observation in view, the reader may compare, in the following table, the death-rates in different bodies of men at sailors' ages among our civil population, with that, from all causes, in our home fleet, as given above:—

London Fire Brigade	7·	per 1000 of strength.
Metropolitan Police	7·6	" "
England (healthy districts)	7·7	" "
Agricultural Labourers	8·	" "
Out-door Trades in towns	8·5	" "
City Police	8·9	" "
England	9·2	" "

The signal reduction in the death-rate among our troops at home,

made to the death-rate from disease in the Navy to bring it more upon a par with the death-rates in civil life, for the purpose of comparison, it is not easy to determine. It cannot be less, I should think, than six or seven per thousand of the strength at the least.

In 1856, the number of men invalided was 998, or in the proportion of rather more than nineteen in every thousand of strength. In 1857, the number invalided was 1460, or rather more than thirty-four per thousand; and in 1858, the number was 1763, or nearly fifty per thousand. The mean rate for the three years together, in the entire Navy, was therefore between thirty-one and thirty-two in every thousand men. To show how much this varied in different fleets, it may be stated that on the Home Station the rate was twenty-three, while on the East India Station it was fifty-two, per thousand.

By putting together the number of deaths, and the number of men discharged as invalids, in the course of the twelvemonths, the yearly total permanent loss to the service is ascertained. In 1856, this amounted to 1799 men, out of an aggregate strength of 51,730. In 1857, it amounted to 2404, out of an aggregate of

within the last three years, has been such as to bring it nearly to that in the healthy districts of England. Formerly, it was more than double. That this marked decrease may be in part the effect of greater care in the selection of the men, and of a larger proportion of the force consisting of men recently enlisted, is not unlikely, as the same result has been observed in the case of other bodies of men. Thus with the Fire Brigade, the deaths, for the first thirteen years of its establishment (as Dr. Guy has told us in his valuable paper on the *Mortality of the British Army*) were at the rate of 9.6 per thousand; while for the last twelve years they have fallen to 7—a result due, he thinks, mainly to the more careful selection of the men.

42,470; and in 1858, out of an aggregate of 43,120, it amounted to 2878, or a loss equal to the combined crews of three of the largest line-of-battle ships in the Navy.

To put the facts in another way; the proportion of total permanent loss to strength in 1856 was, throughout the Navy, 34·8 per thousand men; in 1857, it was 53·8 per thousand; and in 1858, it rose to 66·7, or a full fifteenth part of the whole strength. If we take one or two fleets by themselves, we find that, on the Home Station, the mean rate for the three years of the total permanent loss was thirty-three per thousand; or, deducting all the losses attributable to violence and accident, that it was at least 28 or 29 per thousand of the strength. In the East India fleet, the mean total loss for the triennial was at the rate of 95·9 per thousand, or little short of ten per cent. of the force per annum.

Diseases, &c., most prevalent in Ships of War.

Having now determined the general facts as to the absolute and relative amount of Sickness, Mortality, and Invaliding among the seamen of our Navy, the next point is to find out the principal causes which contribute to the production of the temporary, as well as of the permanent, losses sustained by the service from one year to another. Avoiding all minute details, as suited for the professional rather than for the general reader, it may be stated that about one-half of all the entries on the sick-list are due to ailments of a slight, or at least non-serious, nature, and consist mainly of venereal complaints; or of boils, ulcers, and skin diseases; or of trivial wounds and

contusions. This moiety of the sickness occasions but a fraction of the losses by death and invaliding (considerably more by the latter than by the former), and may, therefore, be passed over with the single remark that the extensive prevalence, in some fleets, of the first named group, is a subject which seems to call for some attention on the part of the authorities in sea ports, not only in consequence of the serious amount of temporary loss of service thus occasioned, but also from the consideration that the constitution of many men is thereby gravely damaged, and rendered doubly or trebly susceptible of some other diseases, which cause much of the permanent losses from one year to another.*

The diseases which occasion by far the greatest amount of mortality in the service are (1) fevers, (2) diseases of the bowels, and (3) diseases of the lungs, etc. It is, therefore, these three groups of sickness which demand our special attention, more particularly in regard to the causes which favour their production and enhance their fatality. But before going into particulars, a preliminary remark or two requires to be made.

Some Ships more Sickly than others.

The first point, which must strike every inquirer,

* "That a disease so destructive of health and happiness, which, by an acquired constitutional taint, may be transmitted to generations yet unborn, should be allowed to go on increasing in our large sea-ports to an extent unknown in any other part of the world, is greatly to be deplored; but so long as the municipal authorities of those towns, where it is most rife, refuse to cooperate with the Government in establishing hospitals for the cure of the degraded creatures that swarm along their pavements, it will be in vain to hope for any abatement of the evil."—*Report on the Health of the Navy*, for 1856.

is the marked difference between different ships of the same squadron in respect of healthiness, or otherwise. While some ships are very sickly, others similarly employed, and apparently exposed to like external or atmospheric influences, are at the same time comparatively healthy. When such an occurrence is observed in a dwelling or cluster of dwellings on shore, the idea at once suggests itself that the difference must be due to some local cause—either to the good or bad sanitary condition and arrangement of the houses, or to a difference in the constitution and hygienic peculiarities of the occupants, arising from diversity of age, diet, occupation, etc.

It is not always easy at once to discover the chief cause or causes of the insalubrity, and mistakes are often commited by men who, under the influence of a favourite doctrine, are apt to confine their attention to one set only of agencies and overlook the effect of others. A house may, to the outward eye, be a picture of neatness and beauty, it may be as trim and clean as hands can make it, it may have been well constructed, with drains and sewers which are carefully looked after to prevent all obstruction, its sitting rooms may be well aired and as fresh and sweet throughout the day as can be desired;—and yet in such a dwelling some of the inmates, whose health previously had been good, are constantly ailing; with head-ache, loss of appetite, and general malaise and debility, if not with bowel and febrile complaints. And all this may be owing to some overlooked and unknown old cess-pit under or close to the basement; or to the foundation being damp and unaired; or to a stagnant pond or manure heap close by; or it may

be that the doors, windows, and register stoves of the principal bedrooms are so carefully fitted, that not a breath of air can pass in or out of the rooms at night; or that too many of the domestics may be sleeping in one chamber, and this may be on an ill-ventilated basement floor, or over a stable or outhouse where dust and other refuse are allowed to lodge. Or failing any of these evils, the water supply may have acquired some taint or noxious impregnation, which slowly but surely affects the health. However obscure at first may appear to be the cause of the mischief, we may be assured that in sanitary problems, just as in the problems of other physical sciences, a solution of most phenomena may be confidently looked for from exact and patient inquiry. What has been said about a house equally applies to a ship, which is only a floating detached dwelling, often moored in an unhealthy site, and in frequent communication with other separate dwellings of the same sort, and with the villages and towns on shore.

The greater sickliness of some ships over others may be for one season or year only, or it may continue for two or three years in succession. Occasionally a ship has been so uniformly unhealthy, whenever it has been put in commission, that she acquires a thoroughly bad name in the service.

I will give two or three examples of notably unhealthy ships.

The *Hannibal* was in 1855, and again in 1856, very sickly. When in the Black Sea in the former year, besides suffering from bowel complaints more than the rest of the fleet, no fewer than 207 cases of typhoid fever occurred among her crew of 830,—"while

other ships of the same size and similarly engaged had not a fourth or a sixth part of the number." The fever continued to infest the ship in the following year, when stationed in the Mediterranean; it appeared to be but little influenced by the locality where she was, or by the duties in which the men were engaged. As suggested in the Returns, this sickness must have depended "upon a cause within."

The *Conqueror* and the *Centurion* were commissioned about the same time at Devonport, and served in the Mediterranean during 1857 and 1858. The former had a crew of 900, and the latter one of 740; both seem to have been similarly engaged during the whole period. Yet, in both years, there were more than ten times as many cases of low fever (besides a great excess of bowel complaints, erysipelas, and ulcers, as well as of chest and throat complaints) in the *Conqueror* as in the *Centurion*. "It is obvious," Dr. Bryson remarks, "that there existed some radical defect in the sanitary condition of the former, or that the physical condition of the one ship's company was far inferior to the other."

The *Dauntless* frigate while on the West India station in 1852-3 lost nearly seventy of her crew, within a few weeks, from yellow fever, which went on attacking the men as long as they remained on board, and only ceased when the whole ship's company were landed at Barbadoes. Throughout the Russian war, she served first in the Baltic and then in the Black Sea. Her sick-rate was high throughout the whole time; and the number of cases of fever, in each year, was very much in excess of what occurred in other vessels of her class.

It is quite true that when a ship has got a bad name on the score of health, more may sometimes be made of any future sickness on board of her than of other vessels to which no black mark may be attached; nor can we wonder at this, as it is scarcely possible for any one sailing in her to divest his mind of her health antecedents, and it is well known that the mere suspicion or dread of a sickness will often go a great way in inducing it, and certainly in aggravating its nature—a strong proof, by the way, of the value of a good repute, and of the necessity of preventing to the utmost any tendency to mental depression or alarm among a ship's company. Nowhere is panic from a pestilence so dreadful as on board ship at sea. But that there was some hurtful physical cause present in the *Dauntless* is, at all events, highly probable, when the history of the *Rosamond*, formerly the *Eclair*, is considered. Besides the disastrous loss of so many of her crew from yellow fever, in 1845, and the reappearance of a similar disease on board a year or so afterwards, when commissioned under a new name, she again proved an extremely sickly ship in 1852 on the West India station, and again in 1854 when employed in the Baltic, being there infested more than any other ship of the fleet with low fever and other zymotic maladies, and her daily sick-rate averaging the enormous proportion of 8 per cent. of her crew, throughout the whole period. The ventilation in her between-decks is stated to have been most imperfect, besides other causes of insalubrity to be afterwards noted.

Causes of Insalubrity in Certain Ships.

It is, obviously, of primary importance to determine the probable causes of the marked unhealthiness of some vessels in a fleet over others, seeing that it must be mainly on a solution of this very point that the question as to the improvability of the health of our Navy turns. In some instances the causes appear sufficiently palpable; in others they can only be surmised; while, not unfrequently, they seem to have hitherto eluded research. In the Navy as in the Army, and in civil life too, the subject of the causation of diseases, and, consequently, the only secure ground for their prevention, has not uniformly been appreciated as its great importance demands. Every year, doubtless, the matter will be more and more attended to, not only by medical men without exception, but also by all executive officers in command of our ships and troops, as well as by municipal and other authorities on shore.

One simple truth may be confidently stated, viz.—that the liability to disease is in general greatly dependent upon, and often is commensurate with, the purity of the air which is breathed throughout the four-and-twenty hours. There is no exception to this law, in any climate or under any condition, at sea or on land. Now there is a two-fold source of impurity in the respired air to be always guarded against. The one source is extrinsic or arising from something external to us, it may be from a marsh, or a foul gutter or drain, or any collection of decomposing matter, which gives off a noisome moist effluvium. The second source is intrinsic, and is unceasingly being supplied by emanations from our own

bodies, independently of any external cause of malaria or miasm. The second of these evils is much the more dangerous of the two; the poison so exhaled is more injurious to health, and its presence is infinitely more common, following us wherever we go, and only avoidable by unceasing vigilance in maintaining the renewal of fresh air around us.*

That both these sources of atmospheric impurity are at times apt to affect mischievously the crews of our ships of war, appears from the following brief instances out of others, cited in the recent official reports. And first as to some of the effects of overcrowding and defective ventilation.

Fever.

Forty cases of fever occurred in the *Eurotas* frigate, while in the Mediterranean, between April and June 1856. Her medical officer "was unable to account for the disease, unless it arose from the extreme lowness and closeness of the deck on which the men were berthed."

In the *Valorous*, an outbreak of fever took place in May 1858, on the passage from Ferrol to Plymouth, where fresh cases continued to occur for some

* "Air contaminated by foul and stagnant exhalations, particularly those from the living body, is the ascertained cause of typhus fever, which has been a more grievous and general source of sickness and mortality in the navy than even the scurvy. * * * The infection of fever is generated by the breath and perspiration of men, crowded for a length of time in confined air, and without the means of personal cleanliness."—Sir G. Blane.

The case of the Egyptian frigate, which arrived last year at Liverpool with her crew in such a wretched condition, and occasioned so much alarm at the time in that city, was one out of many instances of the truth of these remarks.

weeks after her arrival. Three proved fatal. "With the exception of a somewhat imperfect ventilation, in consequence of the main deck ports having been caulked in, previous to her departure for Ferrol, no cause (of the sickness) could be discovered" by a board of executive and medical officers appointed to examine the ship.

Thirty-four cases, six fatal, occurred among the crew, 825 in number, of the *Princess Royal*, while conveying a portion of the 11th regiment from Malta to Alexandria, between the 4th and the 17th of January 1858. The first case was on the sixth day after leaving Malta, and the rest within the next fortnight. As to the cause of the outbreak it is stated that, in consequence of the boisterous weather, "it was necessary to keep the ports, both on the main and lower deck, barred in during nearly the whole of the passage." The spread of the disease seems to have been checked by removing the men from the lower to the main deck. Other ships of the line carried a larger number of troops without detriment. Thus the *Majestic* conveyed 800 troops from the Crimea to England in the summer of 1856, and not a single case of fever occurred among her crew. But the previous history of the *Princess Royal* shews that, though a new ship, she was very sickly in 1855 while in the Black Sea. She then lost more men from fever than any other ship in the fleet, or than even the Naval Brigade serving before Sebastopol, notwithstanding all their exposure to wet and cold and their incessant toil in the trenches. In 1857 also, a bad form of fever broke out on board of her at Corfu; 3 out of 17 cases proved fatal. As the *Royal*

Albert, which was lying there at the same time, remained free from any febrile attack whatever, the disease must have been owing rather to some cause connected with the ship herself, than with the locality. Her crew had, moreover, in the early part of the same year, while at Lisbon, suffered much from ulcers, and phlegmonous disease.

It will be afterwards shewn how much the malignant fever of the West Indies, etc., is aggravated by defective ventilation on board ship.

Cholera, &c.

Three or four days after this disease appeared in the *Megæra*, at Calcutta in 1858, she put to sea. The next day the number of attacks had increased. Subsequently, the boisterous state of the weather requiring that the main deck ports should be kept closed, all the sick, etc., were put on the upper deck under an awning. From that time, the disease subsided and soon ceased entirely. Within a fortnight, nearly an eighth part of the crew had perished.

About the same time, the *Pylades* was attacked on her way from Calcutta to Trincomalee; "the sick were discharged into the receiving ship (on her arrival there), where, under the influence of better ventilation and a more suitable diet, the disease soon ceased entirely."

The most memorable instance on record of the effects of defective ventilation on the fatal progress of cholera occurred in 1854, in the *Britannia* while in the Black Sea, and just before the sailing of the expedition to the Crimea. Within five days or so, no fewer than 229 out of a crew of 920 were at-

tacked (besides nearly 400 with diarrhœa), and of these 139 died. The ship had put to sea in the hope of getting rid of the disease, which had begun to appear on board of her and some other ships of the fleet at Varna. For a day or two the change appeared to have done good; but the weather became boisterous and all the lower deck ports had to be closed. Thereupon, the pestilence broke out in its full fury in the course of the following night. On returning to Baljik, the whole crew were removed into some empty transports; and there was an end of the disease. The total loss of life from this short outbreak was considerably more than double all the fatal casualties, on board the whole fleet, from the fire of the enemy in the attack against the sea batteries of Sebastopol. None of the officers of the *Britannia* died from cholera. Such a fact is always significant.

The tendency to diarrhœa and dysentery is always observed to be much increased, and their obstinacy and severity to be greatly aggravated by defective ventilation on board.* These are generally the most common and fatal diseases on board crowded troop and emigrant vessels; ships of war also have often suffered most severely from their prevalence. The same thing may be said of another occasionally most troublesome and disabling set of maladies in long voyages, viz., ulcers and erysipelas. Several of the large ships of our Baltic fleet in 1855 suffered seriously from this cause. The surgeon of the *Colossus* considered that "the crowded state of the decks and

* "The dysentery, which stands next in order (to fever) in point of fatality, is also generated and propagated by the want of cleanliness and ventilation."—Sir G. Blane.

the want of personal cleanliness among the newly-raised men, combined with imperfect ventilation on the orlop deck (where most of the attacks occurred) were the principal causes of the disease."

The *Calcutta*, the admiral's ship, on her voyage out from England to Hong Kong in 1856, had an unusual number of cases of ulceration on board. "I have no hesitation in saying," writes the surgeon, "that the sick berth is manifestly the head quarters of the disease, where large numbers of suppurating sores have been congregated together in a confined and overcrowded place." When a portion of the crew was landed, and better ventilation of the decks established, together with an ampler supply of fresh provisions, the tendency to sloughing ulceration ceased.

The preceding instances of the evil effects of Overcrowding on board ships of war entirely accord with the experience of the army and of civil life, in close unwholesome barracks, workhouses, etc.

Effects of Impure Holds.

The other cause of atmospheric vitiation occasionally on board ship is the admixture of malaria from impurities in the hold, etc., of the vessel, or from her own timbers in a state of decay. The following recent instances from the Navy Returns illustrate this point.

The great sickliness of the *Rosamond* in 1854, previously mentioned, was ascribed by her surgeon to the state of her hold. "Several cases" (of typhoid fever) "occurred in men employed in cleaning the bilges; there was a considerable accumulation of filth

under the magazine. Whenever the hatches were kept closed for a time, a foul smell was perceived on opening them." A like state of things was reported of this vessel eight years before.

In 1856, the *Herald*, on the Australian station, suffered much from alvine flux, while cruising among the Feejee Islands. "The greater number of the cases occurred amongst the men berthed on the port side of the lower deck. The gunner's store-room was therefore cleared out, and some very offensive matters were discovered, which produced nausea and faintness in one or two of the men employed on that duty." With the thorough cleansing of the hold, the disease seems to have subsided until the following year.

The *Hecate*, one of the West African squadron in 1858, had sixty-three cases of fever (which in several instances had the character of the less aggravated form of yellow fever) among her crew of a hundred and thirty-two, during the more healthy part of the year between February and May, and chiefly while she was at sea, cruising between the coast and the island of Ascension. Her surgeon was of opinion that the sickness was mainly due to fœtid exhalations, so offensive as to cause nausea and headache, from the hold, which was found to be exceedingly foul from the accumulation of a quantity of rubbish and black mud. "But the most offensive effluvium seemed to come from the wood lining the inside of the hull, which was in a state of decay, and in some places covered with fungi, so that it crumbled away before the common iron scraper."

Another of the African squadron that year, the

Hydra, was similarly affected. Forty-two in a crew of a hundred and twenty-five were attacked, while at sea. Large quantities of black stinking mud were taken out of her hold.

In the course of the same year the *Boscawen*, the admiral's ship on the Cape of Good Hope station, had thirty-six of her crew smitten with fever; "the cause of which appears to have been connected with the state of the hold." Five of the cases were fatal. Besides fever and bowel complaints, boils and ulcers were rife among the crew; out of six hundred and eighty men, eleven died and twelve were invalided from disease alone in the twelve months.

To what extent the two causes of insalubrity above-mentioned operate in the production of sickness in our ships of war in the present day, it is not possible to say with any degree of certainty. That, as compared with what existed in the Navy sixty or seventy years ago, they are now feeble and infrequent is known to all who are acquainted with the medical history of the service. Even since the close of the great continental war in 1815, a notable reduction in the losses from disease among our seamen has taken place in consequence of various improvements, sanitary and hygienic, on board ship; and still more recently, the death-rate in some stations appears to have been lower than it used to be in previous years.

These general facts suffice to show how much the effective strength of our Navy is dependent on the due observance of the established laws of health, and should serve to encourage us in pursuing a like philanthropic course of carrying into effect, to the utmost, every amelioration which the progress of science may indicate.

Diseases most Disabling and Fatal in the Navy.

I will now briefly analyse the recent mortuary returns of the Navy for the purpose of determining the relative mortality produced by different classes of disease, so that the reader may understand what are the principal causes of the permanent losses sustained by the service from year to year. Out of the 2,125 deaths from disease alone during the three years 1856, '57, and '58 (the total loss from all causes amounted to 2,735), 559 were due to fevers, chiefly of the continued type; 715 were due to diseases of the bowels, chiefly alvine flux and Asiatic cholera; 440 were due to diseases of the respiratory organs, especially to consumption. On each of these three classes I shall make a few remarks; and first of

Fevers.

This class of diseases varies much in frequency and fatality in different years upon all the stations, so that the experience of any one year alone might give a very illusory idea either of their local or of their general prevalence.

Fevers occasion but little of the sickness or mortality in the Home fleet. The annual number of deaths from this cause does not average more than eight or nine. Very many of the attacks are the result of intemperance and exposure to wet and cold, when the men get leave to go on shore. As might be expected, a large proportion of these cases occur in some of the ships at Portsmouth and Devonport. Occasionally, however, the fevers contracted there are of a more serious character, being of a decidedly

typhus or typhoid type. Thus, in 1857, the *Blenheim*, the steam guard-ship at Portsmouth, had nineteen cases of this sort among her crew; the attacks occurred "at the same time that a severe epidemic prevailed among the marines at Fort Monkton and at Forton barracks." The fever in the *Blenheim* was preceded by a prevalence of diarrhœa, in some cases of a choleraic character, on board. In 1858, forty-one cases of fever occurred in the *Victor Emmanuel*. The extensive mud-banks around that harbour are said to be but little, if at all, productive of any febrific malaria, or of other noxious effects upon the health of the crews in the port. The same remark is made, in the official reports, as to the mud-flats along the line of the Southampton water. Very different, however, is the case with the estuary of the Medway, which is decidedly the fever locality on the Home station, and where not only a considerable number of cases of fever, but also much other disabling sickness, annually occur among the crews of our ships of war and the workmen in H.M. dockyard, as well as among the civil population of Sheerness and its neighbourhood, from malarious agency. The fevers are generally more or less periodic or agueish in their type; occasionally they are attended with severe gastric and bilious symptoms, and then they are usually more typhoid in their character. The ships anchored high up the Medway generally suffer more than those off Sheerness, which lies open to the winds from the German Ocean. The extremely insalubrious state of that town and of the country round, as affecting the health of the population both afloat and on shore, was brought before the attention of the Privy

Council in 1859; but whether any improvement has since been effected, I am unable to say. In the Appendix are given some of the details respecting the amount of sickness in the ships of war and among the workmen in the naval dockyard, which seem strongly to call for the attention of the Government.

Fevers are generally three or four times as frequent and as fatal in the Mediterranean as in the Home fleet. The majority of the cases are of a mild continued or remittent type; a fifth part or so are intermittent. The average frequency of febrile attacks of all sorts in our ships of war on that station seems to be about seventy in every thousand men, during the twelve months. The annual death-rate from this cause has averaged about two in the thousand. On this, as on other stations, the fever-sickliness of certain ships, while others remained exempt, was very marked in each of the three years.

I now pass to the West India station, where, of recent years, by far the greatest amount of fatal fever has occurred in our naval force. Fully one-half of all the deaths from fever throughout the service, in the three years under consideration, were caused by that fatal pestilence know as yellow fever. Much instructive evidence may be gathered from the details, although in many respects these are insufficient, given in the official reports respecting its history on ship-board.

In 1856, it prevailed with virulence in four ships of the West India squadron, which numbered thirty-seven vessels in all. In one ship, the *Malacca*, it raged with such violence that no fewer than fifty-six

out of a crew of one hundred and sixty-five perished within six or seven weeks. Many of the vessels of the squadron escaped altogether, while others had only two or three sporadic cases of the disease.

In 1857, out of a squadron of twenty-five vessels, two only suffered to any considerable extent. One, the *Brilliant*, lost thirty-four out of a crew of two hundred and thirty in five or six weeks; and the other, the *Orion*, had fifteen deaths; and the notable fact in the case of this ship was that most of the fatal attacks occurred after leaving the West Indies, and during her voyage to England; three actually occurred in the naval hospital at Plymouth.

In 1858 the squadron suffered much less severely, the total mortality from the disease that year being only eighteen. Seven of the deaths occurred in the *Leopard*.

This very fatal form of fever appears to have been, at times, more destructive in our ships of war within the last fifteen or twenty years than was ever known before. All the vessels which have been smitten most severely have been steamers. No sailing ships in former times seem to have sustained such terrible losses as the *Eclair* in 1845, the *Dauntless* in 1852, the *Malacca* in 1856, and the *Icarus* in 1860. This fact is very suggestive. That the excessive heat on board, without adequately free ventilation, has had much to do with the increased malignancy of the distemper is more than probable. It would seem, too, that the accumulation of dirt and other offensive rubbish under the machinery, etc., has in several instances added not a little to the impurity of the close hot air in the between-decks. Reference is fre-

quently made in the surgeons' reports to both these evils. On some occasions, particular parts of a smitten ship appear to have been the especial focus of the poisonous action. Thus, in the cases of the *Argus* and the *Virago*, it was "about the after part of the lower deck and in the fore-part of the engine-room," and the mortality was greatest among the men berthed near these parts; and, in the *Leopard*, nearly all the attacks occurred among the men living in the steerage, where they had been more exposed than the rest of the crew to "an offensive effluvium which had for some time previously issued from the hold and spirit room." On examination much black mud, mixed with half-rotten chips, which had been accumulating for a long time, was found in the limbers. "The exhalations from that part of the ship, the surgeon believed, were the cause of the yellow fever, as the malarious influences from the shore were the cause of the cases of remitting fever."

The prompt abatement, and often the complete cessation, of the disease when the crew of an infected vessel have been moved out of her into clean, airy quarters on shore or afloat, afford conclusive evidence how much the ship herself is apt to be the chief cause of its malignancy and persistence. One or two instances may be quoted. In the case of the *Argus*, the disease all but ceased at once after the crew, sick and well, had been landed at Bermuda. The surgeon was of opinion that "the fever was contracted from local causes exterior to the ship, but that the morbific poison became localised within her. Not one of the attendants at the hospital on shore

was attacked, whilst nearly all those who attended the sick on board became the subjects of the fever." In the case of the *Dauntless*, fresh cases continued to occur for weeks among the portion of the crew left on board, after the sick had been sent to the military hospital at Bardadoes, where they were placed in the same wards with other patients, without a single instance of the spreading of the disease. The same thing occurred in the case of the *Highflyer*, at Port Royal in 1852, and also in more recent instances.

For almost all practical purposes of prevention and arrest, yellow fever may be regarded in the same light as the typhus fever of our own country. All know how much the virulence and diffusion of the latter are under control by wise sanitary precautions; and nearly the same thing may be said of the former. Both are liable, in a confined impure atmosphere, to spread by contagion from the sick to the well; whereas the risk of such an accident is reduced almost to zero in the airy wards of a clean hospital. The inference from this fact clearly is that, by the simple expedient of securing an ample circulation of pure air at all times, but more especially from sun-down to sunrise, to everyone without exception on board a sickly ship, the virulence and extension of the disease would be greatly controlled. The not unfrequent increase of the disease for the first few days after leaving harbour is doubtless owing to the impeded circulation of air in the between-decks, principally at night, from the closing of port-holes, etc. Whenever the sick have been treated in tents or under an awning on the upper deck, instead of in the usual sick bay, and the between-decks have

been kept freely ventilated, salutary effects have been always obtained.

The marked influence of a high temperature in favouring the development and progress of yellow fever, and of a cool climate in mitigating and arresting its course, is a point of much practical interest, as indicating the advantage to be derived by the removal of a sickly ship from the tropics to a higher latitude, when, notwithstanding the adoption of every available precaution, the disease continues on board. By increasing to the utmost the continuous circulation of air throughout the ship, and dispersing the men as much as possible, chiefly on the upper deck or decks, a certain amount of benefit is sure to be obtained. Instances, however, will occur where the only safety is in leaving the West India station as quickly as possible, and moving to the northward. Much fresh sickness, and even considerable mortality, it is however to be remembered, may take place during the passage, and before the vessel is able to reach a sufficiently cool climate, if the crew continue to occupy the close and infected between-decks as hitherto. Thus, the *Malacca* had eleven deaths on the passage (eleven days) from Port Royal to Bermuda, and thirty-eight fresh cases of the fever. The *Firebrand* lost ten men on the passage (twelve days) between Port Royal and Halifax, and had on arrival no fewer than seventy-nine of her crew laid up. The *Spiteful* took seven days in going from Nassau to Halifax; eleven men had died on the passage, and there were forty-six cases of fever on the sick list when she reached that port. Occasionally, from stress of weather, the voyage from the West Indies

to the North is rendered very tedious, occupying as many as twenty days to Halifax; and in a few instances, the sick ship, being unable to reach even Bermuda, has been forced to bear up for England.*

These circumstances serve additionally to shew how much this subject—the outbreak of yellow fever in our vessels of war—calls for a thorough inquiry into all the circumstances which may, on the one hand, favour, and which, on the other hand, may mitigate or arrest its virulence on board ship. The necessity for such inquiry is strongly urged in the last published Statistical Return, that for the year 1858, in consequence of the very disastrous loss of life in several vessels of the squadron during the past year, —so disastrous that Admiral Milne has recently given orders for the more prompt abandonment of the tropics by all infected ships in future.

The West Indies is not the only station which has suffered from yellow fever. The fleet on the east coast of South America sustained serious losses from

* H.M.S. *Barracouta* sailed from Jamaica for Bermuda on the 24th October, 1860. Yellow Fever appeared during the passage; besides her ordinary crew, she had upwards of a hundred supernumeraries on board. On arrival at Bermuda, "the civil authorities, dreading the introduction of the fever into the island, would not permit any communication, or allow the sick to be landed. Medicines, fresh provisions, and other necessaries were, however, sent on board." While making for Halifax, she encountered a violent gale which compelled her to shape a course for England, where she arrived on the twentieth day after leaving Bermuda. Of twenty cases of fever on board, six proved fatal.

If the above statement, respecting the conduct of the civil authorities at Bermuda, be correct, this was most reprehensible, and surely calls for official explanation. It may seem strange that the naval authorities did not insist upon the sick being landed, especially as there is a separate naval hospital on one of the islands, and as the *Barracouta* was also very much over-crowded at the time.

this disease in 1856-57-58, as well as in some previous years. Formerly, the Brazilian station was singularly healthy and exempt from all malignant fevers. From 1830 to 1843, the yearly death-rate in the fleet there did not average more than a trifle over seven per thousand of the strength—a ratio less than that upon the Home station. But for the last ten or twelve years it has been very much higher; and this in consequence of the yellow fever, which first appeared in Brazil in 1849-50.

On the Pacific, the Cape of Good Hope and the Australian stations, fevers are comparatively rare and mild. In our West African squadron, there has been a great reduction for a good many years past in the mortality from this cause, the annual death-rate therefrom not having exceeded during the trienniad under notice five per thousand of the strength.

This reduction has been owing in part to the absence of the malignant form of yellow fever from the African coast in that period, and for three or four years previous; in part also, to the salutary changes which have been introduced, mainly on the recommendation of the medical department of the service, into the mode of conducting the duties of the station. "By a wise and humane regulation, the deadly practice of sending boats away on detached service, to watch or intercept slavers, has been interdicted, or, at all events, greatly restricted. Prize crews are no longer turned adrift to wander through the streets of Sierra Leone, where the vessels they navigate from distant parts of the station are delivered up to the authorities of the mixed commission court; the orgies of 'the barn,' which lowered the character of the

white man in the eyes of the black, have long since ceased; and last, though not least, the introduction of quinine wine as a preventive of fever has not only reduced the number of febrile attacks, but has lessened the severity of those which do occur; and thus the mortality has also been reduced to a level which does not materially exceed the death-rate from fever on some of the more healthy stations."

Eruptive Fevers.

This class of diseases is, as might be expected, comparatively rare among seamen. Occasionally, measles and scarlatina appear in particular ships, chiefly on the Home Station. But the only exanthematous fever requiring notice is the small-pox.

The extent to which this disease has of recent years existed in the Navy will be seen from the following facts. In the Black Sea fleet in 1854 and 1855 there were eighty-one cases, of which five proved fatal. In the Baltic fleet during the same years, three hundred and three cases occurred (eighty-five in the *Neptune* line-of-battle ship alone), and of these eighteen were fatal. In the majority of instances, the disease seems to have been caught in Portsmouth or Plymouth before the ships sailed.

In 1856 the total number of cases of small-pox throughout the entire service was thirty-nine. They occurred chiefly in the Home and Mediterranean fleets. Three of the cases ended in death. Whether the patients had been vaccinated or not, is not stated. In 1857 the number of cases in the service amounted to twenty—ten on the Home, and six on the East India station. No case proved fatal. In 1858 the number

of cases was eighty-three—forty-seven on the Home, and thirty-one on the East India station. There were ten deaths.

"By a circular recently issued by the Director-General, the medical officers of the Navy are instructed to vaccinate, on their entry into the service, all persons who do not present marks of variola, or of previous vaccination. This will, no doubt, tend to lessen the virulence of small-pox, and to reduce the mortality consequent upon it." On more than one occasion, our ships of war have introduced the disease into populations on shore. Thus the destructive epidemic at Malta in 1830, when fifteen hundred deaths occurred, was said to have been brought to the island by H.M. ship *Asia;* and it was only last year that two seamen, from H.M. ship *James Watt*, were landed with the disease at Gibraltar, but where from the precautions taken it spread to a limited extent only.

Diseases of the Bowels, chiefly Alvine Flux and Cholera.

There is one station where these diseases prevail with unusual severity in almost all years, causing the principal amount of sickness and mortality among the fleet employed in that part of the world, viz., the Indian and Chinese waters. On all the other stations, they occasion a much smaller comparative amount of the sickness, and are, moreover, far less persistent and destructive. Everywhere at times, more especially during the summer and autumn months, there are occurring more or less severe outbreaks in particular ships, which it is often not easy to explain. Such local epidemics of diarrhœa, etc., are not unfrequent in ships lying in harbour on our

own coast, as well as in the Mediterranean and elsewhere. The diarrhœa is sometimes of a decidedly choleraic character, and occasionally sporadic cases of malignant cholera are met with, usually between the beginning of July and the end of September. Dysenteric affections are, as a general remark, decidedly more frequent and severe in the Mediterranean than in the Home fleet; but the mortality resulting therefrom is seldom considerable. On the West India station they are still more common, more especially in ships which have been long engaged off Grèytown and some other ports in the Gulf of Panama. Dysentery is, however, far from being a cause of much fatality on the station generally. It is the East India and China fleet that calls for special notice under this head.

Out of the entire number, 492, of deaths caused by alvine flux (dysentery and diarrhœa) throughout the service in the three years, 425 occurred on this station; in the year 1858 alone, there were 252 deaths. It was on this station also that most of the deaths from cholera took place. Out of the entire number, 160, no fewer than 138 were in the ships engaged in these seas; and of these 110 occurred in 1858.

The excessively high rate of sickness and death on this station, not only during the three years under notice, but on all former occasions when our ships have had to anchor for a length of time in the estuaries of the large rivers, or off the low and swampy coasts of these regions, is a subject of great public importance. The nature of the sickness is almost always the same, viz.: the generally associated diseases

of dysentery and remittent fevers, of which, the former is far the more fatal of the two. The season of the year has much to do with their prevalence. From December to about the middle or end of April they are comparatively infrequent, but from May to November their prevalence and severity are enormously increased. Hence the necessity of keeping this fact steadily in view, in time of peace as well as of war, as far as the exigencies of the service will admit.

In 1841, such was the amount of sickness and mortality which followed the capture of Canton (during the hot season) that "it was almost fatal to the efficiency of the Naval force." In 1857, the city was taken on December 29th, and "notwithstanding the fatigue and exposure of the men, the number of febrile and diarrhœal attacks which followed was by no means great—owing, it is presumed, to the season of the year being more favourable to the health of Europeans than that chosen in 1841."

The attack on the Peiho forts in North China took place on May 13th, and on the 22nd the force proceeded up the river to Tiensin. The men continued in good health. On the conclusion of the treaty, the force was withdrawn and reimbarked in the beginning of July. On the whole, the expedition suffered comparatively little from sickness.

A good deal of the sickness on this station among the men is doubtless owing to their recklessness and wilful neglect of the most obvious precautions; for the officers, generally speaking, suffer much less in proportion, in consequence mainly of their greater attention to food and clothing, and of less intemperance.

The use of the water of the rivers, contaminated as it is with manifold impurities, has been reasonably enough suspected of having not a little to do with the excessive prevalence of alvine flux in the Indian fleet; this idea seems to be confirmed by the extreme frequency of intestinal worms among the sick. But this subject still needs further examination, as it is alleged that the crews of some ships, who have used only water distilled from their engines, have suffered as much as others where that practice was not adopted.

The occasional marked immunity of some ships from the diseases which prove so prostrating to others is highly suggestive, and demands a more searching inquiry than it seems yet to have received; for what is true of one vessel may reasonably be expected of others under like conditions. There is certainly not a more important problem in Naval and Military hygiene than clearly to determine all the circumstances which favour the induction, and aggravate the severity, of alvine flux. The food, the drink, the clothing, the exposure, the nature and amount of fatigue duties, the accommodation of the men, the mooring of ships, the site of barracks, these and many other points all need to be examined into.

That the tendency to diarrhœa and dysentery is greatly increased by the breathing an impure atmosphere is, as already stated, a recognised fact in medical science. They are the most common pest of crowded and ill-found emigrant and troop ships in all climates, and no diseases have been found more wasting to armies whether in the field or in unwholesome quarters and cantonments.

Overcrowding in a ship will, indeed, occasionally

continue for a considerable time without being followed by any distinct disease, such as fever or flux; but that the health of the persons so treated is deteriorated is shewn by the fact of their being more than usually susceptible of all noxious agencies, on landing after a lengthened voyage. This truth was terribly exemplified in the case of some of our regiments—the 98th for example—in 1841, which lost half their force within three months of landing in China. And, as if to make the experiment complete, it was found that the men who had been quartered on the orlop or the lowest and worst aired deck in the *Belleisle*, in which the regiment had been brought out from England, suffered in a higher ratio than the others.

The power of resisting the hurtful influences of a malarious climate depends quite as much upon the maintenance of a vigorous tone of health throughout the voyage up to the moment of landing, as on the vigilant use of precautionary measures after arrival.

As to the influence of Diet on the prevalence and character of dysentery in India and China, it has been observed as the result of long experience that the disease is much less frequent and severe among the natives than in Europeans, and more especially among British sailors; and this difference has been attributed mainly to the use of a less stimulating diet, and to the non-use of spirituous liquors.

On the subject of the water used for drink, it is to be remarked that the Chinese are said to generally boil it, and then add a little alum to it. "It is worth mentioning," adds the Naval Report of the health of the Navy for 1837-43, "that a number of Chinese prisoners who were confined for some time on board

the *Cornwallis*, and who had no opportunity of boiling the water they used, or of adding alum to it, suffered from diarrhœal attacks somewhat in the same ratio as the ship's company."*

With another interesting extract from the same report, I conclude this part of the subject. "The more general prevalence of diarrhœa and dysentery amongst Europeans residing or voyaging on the coast of China, and even to some extent on nearly the entire southern sea-board of the Asiatic continents, than amongst aliens of the same class residing in other countries or regions in the same parallels of latitude, is a most remarkable fact; whether these affections arise from some peculiar condition of the atmosphere, from telluric emanations, peculiarity of food or water, sufficient evidence has not yet been adduced to enable us to form anything like a satisfactory opinion; for it appears to be a fact, established on the testimony of many intelligent medical officers, that diarrhœa has sometimes attacked the crews of vessels on entering the rivers in China before they had any communication with the land, and before they had made use of any article of food or drink belonging to the locality. Hence in these cases it was generally supposed that the disease originated from malaria or marsh exhalations suspended in the atmosphere; but

* The elixir of vitriol, or dilute sulphuric acid, may be advantageously substituted for the alum. A very pleasant and useful beverage, I may remark, in hot climates and seasons, is made by adding a sufficient quantity of it to water, (or, what is still better, to cold tea), to impart a grateful acidity, sweetening to the taste. This is the *sulphuric lemonade* of some French hospitals. I have known it used with decided advantage as the common drink in diarrhœal and choleraic seasons, and can recommend it from personal experience.

then again, at other times, there were ships' companies who entirely escaped these affections until they began to use the river-water. Thus the evidence which appeared to be conclusive as to the influence of malaria on the health of the crew in one ship was found to be wanting in another, while the evidence which appeared to be equally strong as to the influence of the water in a third was, in a manner, negatived by the eruption of the disease in a fourth before the men began to use it."

Diseases of the Respiratory Organs, including Consumption.

The amount of sickness in the Navy generally from these maladies exceeds that from any other single class of diseases, and often equals that from all fevers and alvine fluxes together. To take one year for example—in 1856, a sixth part of the entire sickness throughout the service arose from this cause. The proportion varies, as might be expected, on different stations; but the influence of mere climate is by no means so great as is generally supposed. For although not so high as in the Home station, where atmospheric vicissitudes are more rapid and considerable than elsewhere, there is still an immense amount in the milder and more equable regions of the Mediterranean, and even under the tropical skies of the Old and New World alike. The mere inclemencies of weather at sea, even when combined with exposure and great fatigue, have much less to do with the frequency and severity of these ailments than most people suppose; but it must be acknowledged that the reckless habits of seamen when on shore, and their disregard of

ordinary precautions against wet and cold, contribute not a little to their production. But with chest and throat diseases, as with fevers and diseases of the bowels, we have again to notice the curious fact that there is often a marked difference as to their prevalence in different ships of the same squadron, lying at the same localities, and engaged on the same or similar duties. Whether this difference is mainly owing to the damper state of the between decks in some ships than in others, according as the wet or dry mode of cleaning them be in vogue, or whether some crews have greater facilities of drying their wet clothes and getting warm food or refreshment on going down below after a cold and stormy watch and before turning into their hammocks, or whether from any other cause it is not easy to say; but that such a difference exists is a notorious fact, and one that well merits examination.*

The point which might least have been anticipated in respect of this class of maladies in the Navy is the great frequency of tubercular disease of the lungs, or pulmonary Consumption. Sea-faring life is usually considered as prophylactic of, rather than predisposing

* "Generally speaking," says the Report for 1856, "the comparative frequency of inflammatory affections of the lungs, in the Home Force, is to be ascribed to the exposure of the men to cold and wet, which it is difficult to avoid when there is a necessity for employing them on dockyard duties and in boats, and their being quartered in cold, damp, and windy hulks during the winter months, where they have few opportunities for drying their clothes." As showing the difference in different ships' crews, employed in similar work, it is stated that "in the *Royal William*, the *Hawke*, *Formidable*, and *Blenheim*, there did not occur a single case of inflammation of the lungs and pleura, while in other ships they amounted, in some instances, to eight, and even to fifteen or sixteen."

to, the weakened and deteriorated state of the constitution on which the development of this disease depends; and experience has certainly shewn that civilians, with a decided tendency to it, have often got rid of every symptom by making a few lengthened voyages. How comes it then that the malady is so common among our seamen, and this too not on one station only, but in almost every part of the world to which our fleets are sent?

We are not surprised at the amount of mortality from this cause among the crowded tenants of the ill-aired dwellings of our manufacturing towns—ill-fed it may be, and often insufficiently clothed; but that it should be equally or even more frequent among our well cared for sailors, with the pure air of heaven always around them, is certainly what was not to be anticipated. Consumption is the most uniform and persistent cause of the large destruction of life in our Navy. Fevers, cholera, dysentery, and, indeed, every other malady vary in point of frequency; in some seasons they are very prevalent and fatal, in others they are comparatively infrequent and innocuous; but in all years, and nearly alike in all climates, phthisis eats its slow and inevitably fatal course into the strength of our Navy, and causes on the whole a greater amount of permanent loss to the service than any other single malady. During the three years, 339 deaths were caused by consumption, and 111 by other diseases of the respiratory organs, chiefly pneumonia and bronchitis. In the same period, 533 seamen were discharged out of the service on account of consumption (which in the great majority of cases would prove fatal within six months of their discharge), and 171 on account of other confirmed pulmonic diseases.

The ratio of the deaths from consumption alone averaged, for the three years, 2·6 per thousand of strength; and the corresponding ratio of the number of men invalided on account of this disease was 3·9. The amount of the permanent loss from this one disease is thus seen to be excessively great.

One remark only as to the predisposing and favouring causes of this evil—a wide subject if discussed in its various bearings—need be made at present, merely to recall to general attention the well-considered conclusion of the recent Royal Commission on the sanitary state of the Army respecting the cause of the great prevalence of pulmonary consumption among our soldiers generally, and its inordinate frequency among the household troops, viz., the close foul air of the crowded barrack-rooms at night.* Is the atmosphere of the lower between decks of a ship of war, after the men have turned into their hammocks, at all less impure? To use a common phrase, it is so thick that you might cut it. And when it is

* The words of the Commissioners' Report are these: "That the ravages committed in the ranks of the army by pulmonary disease are to be traced, in a great degree, to the vitiated atmosphere generated by overcrowding and defective ventilation, and the absence of proper sewerage in barracks."

The inquiries which have recently been made, to ascertain the causes of excessive mortality from lung diseases in certain districts of England, have led Dr. Greenhow to the conclusion that, "working in ill-ventilated and over crowded rooms," and "residing in dwellings so constructed, that the bedrooms are badly ventilated, and the cubical space per head is inadequate to the preservation of health, powerfully aid the operation of other injurious conditions in favouring the development of these disorders."—*Report of the Medical Officer of the Privy Council*, for 1860.

remembered that the men have suddenly to turn out from this close, damp, and fœtid air at night to go suddenly on deck in all weathers, the exceeding frequency of those illnesses, which always serve to accelerate the development of tubercular disease, is only what might be expected. That a large amount of the inflammatory affections of the throat and lungs in the Navy is due to the cause here indicated, will not be questioned by any medical officers in the service; and the experience of the present day is but the repetition of what has been strongly and repeatedly testified to by former observers. Sir G. Blane pointedly alludes to this subject as calling for the attention of the Admiralty in his day, and as one where salutary improvements were manifestly required. In the present day, when most ships of war are provided with steam power, and the heat of the between decks is, therefore, apt to be still greater than it used to be in former times, the necessity for the suggested improvements is the more pressing.

Diseases of the Brain, etc.

There is no class of diseases so fatal, in proportion to the number of attacks, in the Navy as those of the nervous system. By far the greater number of deaths under this head (there were 172) are due more or less directly to intemperance, and are classed under the designation of apoplexy and delirium tremens. The number of men hopelessly ruined in health and discharged as invalids from the service, chiefly from epilepsy and insanity,* swells the above figure to

* In the three years, seventy-six seamen were invalided on the ground of insanity; and that a good many who were discharged on account of epilepsy, palsy, and delirium tremens, would eventually lapse into some form of mental weakness can scarcely be doubted.

"The great proportion of maniacs among seamen is chiefly owing to injuries of the head received in a state of intoxication."—Sir G. Blane.

501, representing the total permanent loss in the course of the trienniad. But even this aggregate gives but a very imperfect idea of the entire sacrifice of life and service arising from this national vice; as it is well known that, independently of many febrile and other attacks attributable to intoxication and its consequences, very many of the violent deaths from drowning, suicide, etc., occur, and nine-tenths of all the crimes and offences are committed, while under the influence of liquor. How to diminish this great public evil by the substitution of acceptable and less pernicious beverages, and in other ways, is still a question for further inquiry, although it has more than once come under the consideration of our Naval authorities.

Amount and Causes of Invaliding in the Navy.

The amount of permanent loss to the service by Invaliding *from disease alone* always largely exceeds that by Death from the same cause. During the three years, the relative proportion was two-fifths greater. The total number in this period invalided was 4221, and of this aggregate 3808 were from disease alone; the deaths during the same time from disease being 2125. Diseases of the lungs were the occasion in 692 cases, and three-fourths of these were consumption. Diseases of the bowels, chiefly dysentery, afforded 585; of this number 324 were from

the East India and China fleet, in 1858 alone. 162 cases were due to the sequelæ of fevers.

Various maladies which add but little to the death-list, annually cause a large amount of invaliding. In the three years,

448 cases were due to Rheumatic affections.
286 „ „ Diseases of the heart.
263 „ „ Ulcers and abscesses.
244 „ „ Hernia or rupture.
243 „ „ Venereal diseases.
235 „ „ Debility—complicated generally with some internal organic mischief, often of the lungs.

The great prevalence of rheumatism, with its disabling effects, is mainly due to the same external influences which occasion so much sickness from diseases of the organs of breathing;—viz., the cold damp state of the between decks in some ships; but principally to the abrupt transitions at night from the heated atmosphere below, when the pores of the skin are open, to, perhaps, a cold and wet watch on deck. The combined loss from these two orders of disease alone amounts to between a third and a fourth part of the total number of men, invalided in the course of the year.

Losses by War, Accidents, &c., compared with Losses from Disease.

I have now to compare the losses arising from the accidents, including drowning, to which seamen are specially liable, and also from the casualties of war, with the losses which have been shown to result from disease. For this purpose I have selected the Baltic

and Black Sea fleets in 1854 and 1855, and the East India and China squadron in 1857 and 1858, during the period of hostilities with China and the Indian mutiny.

The total mortality in the fleets during the Russian war, including the naval brigade and marines serving with the army before Sebastopol, was as follows:

From diseases - - - -	1574*
„ accidental injuries, suicide, and drowning	228
„ wounds received in action - -	227
	2029

In the Baltic fleet, in 1854, only fifteen deaths occurred from wounds in action at Bomursund, Hango, etc.; and in 1855 there were but eleven, of which five occurred from an attack by the enemy on a boat's crew, while landing some Russian prisoners under a flag of truce.

In the Black Sea fleet, in 1854, the total number of deaths from the casualties of war, afloat and on shore, was ninety-four; of which sixty occurred from the attack by the fleet on the sea-batteries of Sebastopol, and nineteen in the naval brigade (about 1200 strong), between the 2nd October, the date of landing, and the end of the year.

In 1855, there were ninety-eight deaths in the brigade from wounds received in the trenches before

* By far the greatest mortality was from diseases of the bowels, principally malignant cholera; 861 of the deaths were so occasioned. Diseases of the respiratory organs caused 217 deaths; fevers 172 deaths, exclusive of 29 deaths from the exanthemata, chiefly small-pox; and diseases of the brain 58 deaths.

Sebastopol, and six on board ship, either in the Black Sea, or the Sea of Azof.

Among the East India and China squadron, in 1857, there were eighty-seven violent deaths out of a total mortality of three hundred and twenty-seven. Of these eighty-seven, thirty-eight were from wounds received in action: viz., twenty with the Chinese, and eighteen in the naval brigade (520 strong) serving in India, against the revolted sepoys. Twenty-nine deaths resulted from drowning, thirteen from accidents, two from suicide, three from causes not stated.

In 1858, out of a total mortality of seven hundred and six, of which one hundred and twenty were deaths from violence, thirty-five were from wounds in action, twenty-seven in China, and eight in India; forty-nine deaths were caused by drowning, seventeen by accidents on board ship, three by suicide, one by a stroke of lightning, and fifteen from causes not ascertained, but "probably the result of injury or violence while on shore on leave, or in action with the enemy."

In the three years, 1856-7-8, eighty-two sailors and marines lost their lives in action, and eighty-nine by drowning.

The facts now stated show how small is the proportion of deaths in our navy, from the mere casualties of War.*

* Like results occurred during our former protracted hostilities with the Chinese, from 1840 to 1843. "The total deaths from wounds received in action amounted to 24, or in the proportion of about one annually in the thousand of mean strength; while the total loss from febrile and dysenteric complaints alone amounted to 547, or in the ratio of nearly thirty to the same amount of force." Even as compared with the number of deaths from other kinds of external violence, that from gunshot wounds was but small; for the deaths from ordinary casualties, principally accidents sustained by falling from aloft or into the holds, were forty-one, and no fewer than one hundred and nine were caused by drowning, five of which were suicidal.—*Statistical Report of the Navy (East India Station).* 1853.

Lastly, the proportion of men discharged out of the service in consequence of accidents and wounds, as compared with the number discharged on account of disease, is inconsiderable. During the three years, the number invalided from the former cause amounted to four hundred and eighty-three, out of a total of four thousand two hundred and twenty-one from all causes, or in the proportion of nearly a tenth part of the whole.

And now what are the inferences which seem to be fairly deducible from the foregoing facts and statements?

That a considerable portion of the sickness—the sickness, too, which is apt to be the most disabling and fatal—is owing to agencies which are well ascertained, and which are certainly not inevitable to ship-board life under any exigencies of public duty, will, I think, be generally admitted. The perfect soundness of the observation, already quoted on the title page of this letter, that "It is only by clearly and distinctly pointing out the causes which affect health, that we can hope to avert disease, and reduce the rate of mortality in the naval service," will be accepted by every sanitarian inquirer. Now, no one can well doubt as to the cause or causes of the exceeding and persistent unhealthiness of such ships as the *Conqueror*, the *Dauntless*, and the *Eclair;* or of the typhus fever generated on board the *Princess*

Royal, and the terrible malignancy of the yellow fever in the *Malacca*, and other vessels of the West India squadron in different years; or of the disastrous virulence of the cholera in the *Britannia*, at Varna. That the extreme sickliness and loss of life in the above instances were, to a large amount, avoidable, or, in other words, would not have occurred under circumstances less unfavourable to health, seems to me all but certain. And if this be true in regard of these ships, it is only but reasonable to believe that similar causes in other ships have given rise to like effects, though in a less degree, and varying according to the circumstances of each ship and her crew.

With respect to the all important subject of ventilation, it is now, I believe, nearly universally conceded, by executive as well as medical officers, that the accommodation for the men at night, in most ships of war, is insufficient;* and, also, that there is really no adequate reason for continuing the old usage of berthing almost all the crew upon one deck,

* The following description of the berthing of the men at night, and of its consequences, was given in the first *Statistical Report of the Navy*, in 1840. "The usual space between the suspending points (clues) of the hammocks is from seventeen to eighteen inches, so that, when they are extended by the beds, their bodies are in contact. The effect is to bring the bodies of the men into contact in greater or less number, according to the size of the ships. When at sea with a watch on deck, the accumulation and pressure are reduced by a half; but when in secure harbours, five hundred men perhaps sleep on one deck, their bodies touching each other over the whole space laterally, and with very little spare room lengthways. The direct results of elevated temperature and deteriorated air may be conceived; but it is not easy to conceive the amount of the first, nor the depressing and debilitating power of both, as measured by sensation, within the tropics. The tendency of such a state of things must be to subvert health, and lay the subject of it open to attacks of serious disease."

and that, generally, the least well-aired. I have elsewhere expressed my sentiments on this subject (*vide* Appendix), and beg to refer to them.

The between-decks of some ships are, it is known, so hot and close that for several months at a time, within the tropics, the men are compelled to sleep on the upper deck under canvas. The ordinary windsails are most imperfect ventilators at best; and often they cannot be used when most wanted. A good system, whereby the purity of the air in the lower decks may be maintained, especially when the ports are closed, is still a desideratum. Whether the Committee of Officers, that has recently been appointed to suggest means for improving the ventilation of war steamers, has had their attention directed to the berths of the crew, as well as to the engine-room, etc., I am not aware. It is a point that calls for special consideration, as of recent years almost all the instances of extraordinary mortality have occurred in steam vessels. Indeed, the whole subject of the relative healthiness of sailing and of steam vessels needs to be looked into. In the Baltic fleet in 1854, there was certainly a lower sick rate in the sailing ships of the line, than in the screw liners; and the former suffered much less from diarrhœa and cholera than the latter. In the Black Sea fleet too, in 1854, and again in 1855, the *Queen* and the *Rodney*, both sailing ships, were the most healthy of the squadron. Probably this is just what might be expected, considering the greater heat and closeness, as well as the large store of coal or other fuel, on board steamers; unless, indeed, extra means are resorted to for maintaining a more thorough circulation

of air—a purpose which the machinery in action may always be made to subserve.

It has been seen from the evidence of many officers that the condition of the holds in some ships is very far from what it is desirable that they should always be; for that the exhalations from the lodgment of offensive matters there, and occasionally from the timbers themselves, are productive of mischief to health and predispose to and greatly aggravate, if they do not directly engender, serious disease, can scarcely be doubted. This conclusion is only in accordance with the daily experience of civil and military life in like circumstances; for a foul hold is only a lengthened drain or gutter without the means for the ready escape of its contents, and these too subjected to constant shaking about from one side to the other. The miasmata from such a hold are sometimes spoken of as if they consisted merely of sulphuretted hydrogen—a gas, which, though certainly most noxious to life, cannot be regarded as ever the generator of fever, flux, or gangrene. The gas is but the accompaniment and the evidence of a more serious effluvium; the real source of the mischief arises from the putrescent decomposition of organic matter. Such miasms are, I believe, only less mischievous than the miasms proceeding from living bodies.

Sometimes, and even of recent years, the hold of a ship has been found to be anything but sweet shortly after she has been put into commission. This may have arisen from the practice of keeping a certain number of ships in an advanced state, *i.e.*, ready for commission, with their ballast on board, it may be for several years. When this is once disturbed by the

motion of the ship, the existence of something faulty may be only then discovered. Hence the desirableness that a thorough sanitary inspection and report be made of every vessel before she goes to sea, as well as upon her return to port at the end of her commission.

That not a little of the pulmonic disease, and also of the rheumatism, among seamen is capable of prevention is more than probable when we consider the very frequent cause of these ailments, viz., the abrupt transition from the overheated berth to the cold outer air, on every change of night watches. Humidity, too, is a great promoter of sickness. The dryer dwellings are, the healthier *cæteris paribus* they are. Medical officers are pretty generally agreed that damp lower decks serve to swell the sick list, and that it would be better for the men if dry cleaning and rubbing with hot sand often took the place of washing and wet holy-stoning. What was said in the first published Health Report, in 1840, on this subject was the result of extensive experience on the part of Dr. Wilson in all parts of the world;—"Evaporation, especially in low decks and low degrees of temperature, goes on slowly and, therefore, long; in hot climates it is, of course, more rapid and sooner completed; but in either case there is strong reason to conclude that the effects on health are injurious, sometimes highly so. Their power to excite catarrhal and rheumatic affections will not be questioned; nor ought there to be much question as to their power of exciting many of the inflammatory affections of the lower extremities, which in some ships give rise to much inconvenience and suffering. They tend to

reduce physical force, and thus co-operate in the induction of diseases of debility, or render the body more susceptible of attacks of violent disease."

It is unnecessary to say that it is always of much importance that the men should have the ready means of quickly drying, in a suitable place, their wet clothes when they go below.

The hurtful effects on health of a humid atmosphere are aggravated by the inevitable absence of sun-light from the lower decks of a ship. This point has not escaped the attention of Dr. Bryson in his suggestive paper on Medical Statistics in the Manual of Scientific Inquiry, prepared for the use of officers in H. M. Navy by authority of the Admiralty.*

On the subject of the food and drink in the Navy I have but little to say, and that little will have reference to the East India and China squadron, which, as we have seen, suffers so disproportionately from unmanageable and very fatal bowel complaints. It must be admitted, I fear, that our multiplied experience in Chinese waters for many years past has not yet enabled us to reduce the amount of sickness and mortality to which our ships of war are liable, whenever they have occasion to be long detained in any of the great estuaries. But it would be unjust

* "The marked difference in the appearance of men employed in the bread room and holds, compared with those who are freely exposed on deck, or in open boats, at all hours of the day, cannot escape the notice of the most superficial inquirer. It is, therefore, of importance to ascertain whether exclusion from the solar rays be not, to a greater extent than is generally believed, one reason why men who have acquired a pale waxy look from confinement below are more susceptible of disease, and less capable of sustaining its shock, than are those whose blood is enriched and strengthened by the free exposure to light, heat, and air." —P. 240, 3rd edition, 1859.

to sanitary science to believe that no reduction can possibly be effected in such a climate. That the climate has much, very much, to do with the extreme sickliness is beyond dispute; but then what are the circumstances and conditions which predispose the system to be most promptly and injuriously affected by the climate? Experience seems to point first and mainly to the nature of the *ingesta*; and, secondly, although in a minor degree, to exposure, especially at night and early morning, without due precautions. That the avoidance, as much as possible, of salted meats, and the substitution in smaller quantities of fresh meats with a larger allowance of rice, and, also, the more frequent issue of baked bread in lieu of biscuits, are most desirable, more particularly during the six hot months of the year, is the natural inference from what we know to be the pathological condition of the alimentary canal in dysenteric affections. And for the same reason, we are pretty sure that the daily issue to the men of a sound wholesome wine, in place, and to the exclusion, of ardent spirits could not fail to be beneficial. Of course, there may be difficulties in the way of carrying out such changes to the extent to which it may be deemed desirable; but still it is highly important to discover at all events what are the favouring, and what are the aggravating, agencies of so disabling and so destructive a disease to our Navy as dysentery. The influence of the water used on board for cooking, etc., is one of the points which appear to be far from being clearly determined, although it is difficult to believe but that the quantity of organic impurities in the Chinese rivers must have a pernicious effect on health. We

require to have a series of accurate chemical and microscopic examinations of the water in different localities, so as to compare the results, not only with each other, but also with the ingredients in the river water of other similar regions, where bowel complaints are less frequent than in China.

How to guard against the recklessness of the men when they are on shore, in respect of intemperance and other matters bearing on their health, I am incompetent to form an opinion; it is only the experienced officer who is entitled to speak on the subject. It is enough for my purpose merely to point once more to the sad sacrifice of health and life, that is still traceable to intoxication in the Navy upon all stations. Things are certainly not so bad as they were forty years ago, when half a pint of spirits was served out daily to every lad and man, throughout the service, whether they wished for it or not. Still much remains to be done to lessen the amount of intemperance among our seamen.

To effect a salutary change in this as in every other branch of naval hygiene, it only needs, I believe, that the attention of all the officers of the service, executive as well as medical, and of the general educated public also, be continually directed to watch the influence of every circumstance affecting the preservation of health and the occurrence of sickness in ships, and that all encouragement be given by the administrative authorities for the promulgation of sound opinions, and the tentative adoption of reasonable suggestions. Let no one permit himself to believe that any thing like perfection has already been attained. We have seen what extraordinary

success Captain Cook achieved, now ninety years ago, in preserving the health of his crew; and we know that instances of similar and even greater success have since been attained by following a like course of action. For example, to cite only one or two cases. About the beginning of the present century, the *Glatton* made the voyage round the world and returned to England after twelvemonths absence without the loss of a single one of her crew, 170 in number; and this, too, notwithstanding that she had carried out upwards of 400 convicts to Botany Bay, on the passage out (*vide* Appendix). And on the last of Captain Parry's Arctic voyages, the annual mortality of the crews was at the rate of only 0·5 per cent. of the strength.

It would be a fine thing, certainly, for science and humanity if ten per cent., say, could be struck off from the present ratios of sickness and mortality throughout the Navy. The saving of the loss of service, not to speak of the expense, would be of no slight consequence in a national point of view. Just in proportion, too, to every diminution of disease and death, so, we may be assured, will the robust tone of health and the vigorous alacrity of the well men be enhanced; for it should never be forgotten that there may be, and certainly is, a great deal of lowered health in all communities, short of the occurrence of actual illness. The problem of State Hygiene is not only how to prevent sickness in the public service, but how to maintain the highest possible effectiveness of the men. For the working-out of this problem in the Navy, the more that the medical officers of our ships are regarded in the light of preservers of health, and not merely of healers of

disease, the better; and, certainly, in no branch of the profession can abler and more enlightened men be found than in the medical department of the navy. The more, too, that the bearings of sanitary science are studied by the executive officers, the more they will, I am sure, appreciate their importance, and the more efficient aid they will be ever ready to give to all the recommendations of the medical officers. It is only necessary for them to peruse, from year to year, the very instructive Statistical Reports of the service, to fully understand how much the health of a crew depends upon the condition and sanitary arrangements of a ship.

In conclusion, I will only add that every step of practical progress in the hygiene of the Royal Navy is sure to react with prompt benefit on the health and general welfare of our Mercantile Navy,—which, of course, and rightly so, will always take as a standard for their guidance and example in such matters, the experience of our ships of war. And when it is considered that the number of merchant sailors employed in our foreign trade alone, exclusive of the large numbers on board coast steamers and sailing vessels, exceeds 200,000, and that often no small difficulty is found in obtaining the right sort of men for the service of this vast commerce, the magnitude and national importance of the subject are at once apparent. The best and the wisest, as it is the most humane, course is to use our utmost endeavours to prevent, by anticipative precautions, all unnecessary waste of available strength and power. That there is in our mercantile marine much preventible disablement and sickness—sickness too often terminating fatally, either abroad in hospitals, or among our civil population in this country—is well known to every one whose attention has been drawn to the matter.* The hygienics, indeed, of our merchant seamen have not yet attracted that amount of public notice which their great importance demands. If something of the same system of accurate registration and record, which has for some years now been so beneficially carried out by the Board of Trade, in respect not only of the fabric and sea-worthiness of ships, and of the accommodation to be provided on board for crews and passengers, but also of meteorological, hydrographical, and other scientific observations, all for the good and safety of the service, were extended to the no less important topic of the Vital Statistics of the men employed, results of inestimable advantage could not fail to be obtained. This subject has, I am glad to say, been quite recently taken up by my distinguished friend Dr. McWilliam, Medical Officer of Her Majesty's Customs, in a paper read at the last annual meeting of the National Association for the promotion of Social Science; and it is much to be hoped that his

* "The sanitary and hygienic state of merchant shipping is often very faulty; and there is good reason to believe that there is at all times a large amount of sickness, damaged health, and premature disablement among the merchant seamen, which might be easily prevented by simple precautionary measures." * * * "The sanitary condition, too, of most seaport towns, and more especially of those parts near which the shipping is lying, is generally reported to be extremely unwholesome, and calculated, if not to engender, inevitably to aggravate many of the diseases against which quarantine is directed."—*Report on Quarantine, by the National Association, etc., printed by order of the House of Commons*, August 1861.

extended inquiries may eventually lead to the recognition, by the Government, of the extreme desirableness of establishing a more full and accurate registration of the sickness and mortality among our merchant sailors than has hitherto existed.

I have the honour to remain,
SIR,
With great respect,
Your most obedient Servant,
GAVIN MILROY.

London: March 1862.

APPENDIX.

Unhealthiness of Sheerness and neighbourhood; influence on the Ships of War, Dockyard, &c.—Vide p. 30.

"Information showed, beyond question, that the population of the entire island of Sheppey is, to an enormous extent, afflicted with the effects of marsh-malaria, generated partly within the island, and partly on other adjacent mud-lands or marsh-lands about the Swale and the Medway; and that the diseases thus engendered occasion an immense amount of physical suffering, a very large interference with industry of all kinds, and a serious detriment to the efficiency of Her Majesty's service in that important locality."

Among the crews of the *Edinburgh*, and of the Steam Ordinary, averaging 1251 in number, 130 cases of malarial fever, 64 cases of rheumatism and neuralgia, and 81 cases of colic and diarrhœa occurred during 1857 and 1858; occasioning a loss of 2132 days service in these two years. A similar amount of the same sort of sickness prevailed among the crews of the *Waterloo* and *Formidable*, while at Sheerness, during part of 1858. The proportion of attacks of fever per thousand of the whole naval force was 106, and the average duration of each attack was very nearly nine days.

The Garrison Artillery, as might be expected, suffered still more than the population afloat. In 1856-57-58, no fewer than 344 cases of fever in an aggregate force, for the three years, of 2086 men. The average length of each attack was the same as in the Navy.

As to the workmen in Her Majesty's Dockyard (whose numbers averaged nearly 1700 during the three years), it appears that "of every 1000 men employed, more than a third part (perhaps more than half) suffer during the year from disorders which more or less decidedly are referred to that cause; viz., that 146 of them suffer fever, and that each of the 146 is thus kept from his work for (on an average) 9 4-5ths days; that 63 of them suffer neuralgia or other like pains, and that each of these 63 is thus kept from his work for (on an average) 10 3-5ths days; that 158 of them suffer from bowel-complaints, which are mainly attributed to the same sort of local influences, and that each of these 158 is thus kept from his work for (on an average) 5 days; besides that a very large amount of unrecorded illness and disqualification prevails among other members of the force."

With so much endemic sickness, it is not wonderful that Sheerness is said to be spoken of, at Chatham hospital, as "the African station of our home service."—*Report of the Medical Officer of the Privy Council*, for 1859.

Yellow Fever in Ships of War; effects of landing the sick.—Vide p. 33.

"The great and most important practical question arises, is it safe to permit the sick persons from such a vessel as the *Highflyer*, to be landed among a healthy community? This question was put to me, and, fortified in the opinion at which I had arrived by the results of many similar experiments in this place, I recommended that there should be no interruption to the *Highflyer's* people communicating with the shore; but intimated that it would be dangerous for strangers to be exposed to the atmosphere of the ship, so long as the disease continued in her. There has been no interruption to the communication of the *Highflyer's* officers and men with the shore; her sick have been in proximity with a considerable number of surgical cases from the other ships in the hospital, and with a large proportion of the crew of the *Persian*, affected with a malarious fever.

"No single instance of any kind of fever followed the landing of the *Highflyer's* sick, or the free intercourse of her officers, stewards, and people with the town, either in the hospital or in the town.

"I have witnessed and watched the progress of so many epidemics in this place, as to feel perfectly satisfied that any contagious powers the disease may possess in crowded ships, is speedily rendered inoperative by moderately good ventilation; and that the best mode of checking the progress of such diseases is to remove the sick to roomy quarters on shore as speedily as possible."—*Report of* Mr. Watson, *Medical Officer of Port Royal Naval Hospital, printed by order of the House of Commons*, May 1853.

Mr. Watson and Deputy Inspector Dr. Wingate Johnston were at Port Royal when I was in Jamaica, in 1851, and with both these gentlemen I had frequent opportunities of inspecting the ships of war, and the large naval hospital on the station.

In the dispatch of the Governor of Barbadoes to the Right Hon. Sir J. S. Pakington, Secretary of State for the Colonies *(printed by order of the House of Commons*, March 1853), we read:—

"In forwarding a copy of the report of the Health Officer,* on which the sick of the *Dauntless* were removed to the military hospital, it is very satisfactory to find that by observing the precaution recommended, the disorder was not in a single instance

* "The sanitary measure that I advise, is an immediate removal of the sick to the shore, taking proper precautions for an efficient segregation of them."

extended to the troops, affording, as it does, a strong confirmation of the soundness of the views by which the board have been guided."

Captain Halsted, in his letter to the Governor, mentions that "on the ship's first arrival, all communication with her was peremptorily stopped, an exclusion which still continues with regard to all but the *native* labourers and servants employed on board." The omission of this necessary precaution: viz., of employing only the coloured natives to go off from the shore on board a fever-smitten vessel in the tropics—occasioned, it is to be feared, the spreading of the disease to the unacclimated boat's crew of one of Her Majesty's ships, recently at Port Royal, with very disastrous results. The most regretable point in the history of the *Dauntless* was the not landing the whole, or greater part, of the crew, the unattacked as well as the sick, as soon after arrival as possible. A large number of valuable lives might thus have been saved; as fresh cases, very many of which proved fatal eventually, continued to occur on board for several weeks afterwards.

Defective Ventilation in Ships of War.—Vide p. 55.

"In consequence of the very fatal outbreak of malignant cholera in the fleets at Varna in the preceding year, when general alarm was occasioned in the land and sea forces of the allies, and the expedition to the Crimea was thereby considerably delayed, the Lords of the Admiralty considered it advisable in the summer of 1855 to put the Commission in communication with the Admiral in command and with the principal medical officer of the Black Sea fleet, in the event of epidemic sickness again prevailing in the squadron."

"A minute inspection of the *Royal Albert* was made by Dr. Milroy, in company with Dr. Brien, the principal medical officer, and subsequently of the *Queen*, with Dr. Deas, Inspector-General of the fleet. Especial attention was paid to the arrangements on board ships of war, which are generally believed to have most influence in predisposing the crew to attacks of epidemic diseases, and in rendering these attacks formidable. The foremost of these is the amount of accommodation between decks for the men at night. In line-of-battle ships, the lower gun deck is reserved for this purpose; in two-deckers, the marines as well as the seamen sleep there; but in three-deckers, the marines and boys occupy the fore part of the middle deck. From 600 to 800 men, according to the strength of the crew, are thus usually berthed on the lower or main deck. By the relief of watches every four hours, there may never be more than one-half these numbers in their hammocks at one time; but, nevertheless, the whole have to sleep on that deck from night to morning. * * * When the ports are closed, the only means of admitting fresh air is by the hatchways, with or without the aid of windsails, so that the same openings serve the double purpose of entrance and escape.

"On board the *Royal Albert*, and in other *screw* line-of-battle ships, most of the officers have their cabins on the orlop deck, where all the midshipmen and mates also sleep. This arrangement, introduced of late years, must serve to render the atmosphere in the main deck still more impure; the heated breathed air from the orlop deck passes into it. The officers' cabins are apt to become quite stifling when the scuttles are shut, more especially when the furnaces are lighted.

"The accommodation for the sick in screw ships, as in the *Royal Albert*, is, in several respects, inferior to that on board sailing ships of the same class. The sick-bay is much smaller, occupying only one side of the upper deck forward instead of its entire breadth. It is not nearly so well ventilated, and does not admit of being so well ventilated. It is, moreover, exposed to contamination of atmosphere from the faulty arrangements of the water-closets, which have been adopted in the new ships.

"That the ventilation of the between-decks, and of the cabins, is capable of being greatly bettered by sufficiently simple means cannot be doubted. Still it is very questionable whether, by any means, it can be made so perfect as to render the air at night as pure as is desirable, or even safe in certain seasons, while the crew continue to be crowded together on one deck, and that deck the lower one. At least one-half of the best sleeping space in a ship of war is, in ordinary circumstances, left unoccupied. It is only made available when there is much sickness on board, and then it is used as part of the sick-bay. There appears to be no other reason for its non-occupation at other times, but the practice hitherto of the service. Free space and pure air are, however, as necessary for the prevention of disease, as for its mitigation and arrest.

"The changes in the accommodation for the well and sick, adopted of late in the new screw line-of-battle ships, have had the effect of diminishing the amount of space, without any concomitant improvement in the ventilation of the decks. This point requires the more notice, as the heat on board a steamer is of course greater than in an ordinary sailing ship, and the atmosphere is liable to become more oppressive. Many of the most fatal outbreaks of pestilence in the navy of recent years have occurred in steamers." —*From "Notes on Ships of War," by* Dr. Milroy, *in Report of the Sanitary Commission to the Army in the East.*

From a letter which Dr. Deas wrote me from the Bosphorus to Balaklava in November, 1855, I extract the following passage:—"The want of ventilating tubes, whether fitted into the ship's sides or otherwise, is common to all the decks, and is, doubtless, the cause of some mischief. And insisting on the lower deck in two-decked and frigate-built ships, and the lower and middle in three-deckers, being the only decks for sleeping the whole of the crew is, I fear, the source of still greater evil. *They clearly ought to be distributed over all the decks.* * * * There is no attempt at a

ventilating tube, leading either to the upper deck or into the steam funnel, or anywhere else, from the officers' cabins (on the orlop deck); and these cabins must become most destructive to health, especially when the steam is up." Dr. Deas mentions, also, the want of proper accommodation for the reception of the wounded in action in screw liners, and of the bad state of the cock-pit generally in these vessels. The opinion of so experienced and able an officer is, of course, entitled to great weight.

Diet of the sailor in malarial climates.—Vide p. 59.

Deputy Inspector Dr. Smart, in a valuable paper on the Diseases of the Navy at Hong Kong, just published in the *Transactions of the Epidemiological Society*, draws attention to a point of no small moment in the preservation of health in both public services. "From this," (*i. e.* the diurnal ranges of temperature from a high heat to great chills), "we should derive a very important indication, not always attended to, to watch carefully that our men on night duty are well protected by warm clothing, and fortified by the stimulus of warm food and drink during the night and towards dawn. By routine we crowd the aliment of our men into a few hours before and after mid-day, by which the system is left without support when most urgently demanded to ward off the depressing influences of climate. I am convinced," adds this experienced observer, "that the invasion of diseases, which have cost the lives of hundreds of our brave seamen and soldiers, has been greatly owing to this erroneous system."

The point here indicated was carefully attended to in the case of our troops during the late operations in China, and, as was to be foreseen, with most salutary effects.

Case of the Glatton; mode of ventilation, vide page 61.

This vessel, one of the old East Indiamen class, was fitted up specially, under the direction of Count Rumford and Sir G. Blanc, for the conveyance of convicts to Botany Bay, in consequence of the great mortality which had previously taken place in the transports employed in this service. The voyage was performed without either fever, flux, or scurvy occurring on board, and with the loss of only five of the male and two of the female convicts from chronic diseases.

The means adopted to insure effective ventilation of the between decks were a series of air-tubes passing up from where the convicts slept to the open air; also a narrow opening amidships along the whole length of the upper deck, protected by a pent-house covering raised a few inches above it to prevent rain, etc., from entering, and scuttles at the side to open or shut according to the state of the weather. The air-tubes and the deck opening acted, of course, in all states of the weather.

PAMPHLETS

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