

ON CERTAIN VIEWS REGARDING FEVER IN INDIA.

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MR. PRESIDENT,—Within the past few years the subject of Fever, as affecting British troops in India, has been considered from a point of view altogether different from that according to which it had been previously investigated. Hence it happens that considerable divergence of opinion exists between the older observers and the more recent with regard to several important details embraced in that inquiry. In the meantime this very serious statement is officially made, namely, that “of late years the proportionate fever mortality has increased nearly a fourth, and the proportion of fatal cases entered as ‘enteric’ fever to all other fevers has quadrupled”. It accordingly appears to me that further investigation may be facilitated and helped on by means of a short summary, such as I now have the honour to submit, of some views expressed with regard to history, causation, phenomena, pathology, and a few other circumstances connected with the large class of disease embraced under the general head of *Fever* in that empire.

In my attempt to bring together each set of views, and compare them with one another, I have considered it expedient to refrain from introducing the names of the authors of those opinions. By adopting this plan, I hope the more distinctly to indicate that I deal simply with *opinions*, not *persons*; for where views are held, of a nature absolutely divergent from each other, and conflicting against others, such as I am about to narrate, the expediency, I think, becomes manifest of avoiding any expression of a nature likely to introduce an element of personality into our attempt to throw light upon a very difficult question, in a science which by its very nature can hardly be described as *exact*.

It appears desirable that I guard myself by one more preliminary remark, namely, that the several views I am about to express are those of eminent and well-qualified

observers on either side of the question. All that is *mine* is contained in the *deductions* I have drawn from a comparison of those views; and how far those deductions are correctly arrived at, or otherwise, you, sir, and this meeting will be in a position to judge as we proceed.

1. *In Ancient India*.—The hakeems, or native physicians of India, recognising the close alliance existing between fever and dysentery in that country, assign both affections to similar causes, namely, high temperature, humidity, exposure to changes of weather, fatigue, and privation; and the circumstance is, to say the least of it, interesting, that among the views at the present time entertained with regard to that form of fever to which I am about more particularly to solicit your attention, namely, that attended by ulceration of the iliac glands, with or without other intestinal lesion, is, that its alliance is more with dysentery than to idiopathic fever. Thus is the theory of twenty-four centuries ago reproduced in our day. In ancient times works on Hindoo medicine contained descriptions of thirteen kinds or forms of what were called by the early physicians “mixed fevers”, the following being the characteristics, according to them, of the *second* form in their enumeration, namely, “*Pittulbana* or *Asukari*. The peculiar symptoms of this form are looseness, giddiness, fainting, apthæ in the mouth, red spots, and a burning sensation over the body”. (*Hindu Medicine*, by Dr. Wise, p. 228.)

2. *By later Writers*.—*a. The Older*.—With more especial reference to fevers affecting British troops and European residents in India, the older medical officers wrote as follows, namely: In the course of almost every protracted fever which terminates fatally, there is a period marked by subsultus tendinum, rapid and feeble pulse, low delirium, brown sordes on the tongue and teeth, usually considered *typhoid*—that is, in regard to *condition*, not to specific nature of the disease. Certain organic lesions were described as *results* of endemic fever—not as of themselves constituting the primary disease itself; it was stated that the more irregularity intermittent fever presents, the greater is the derangement of the abdominal viscera, including liver, spleen, and alimentary canal. Intermittents often run into remittents, and then become continued; remittents and continued fevers in their turn change to intermittents. The expression *typhoid*, as indicative of a *condition*, was in general use in reference to these several forms of endemic fever, the fever itself believed to be solely due to endemic and climatorial influences acting upon par-

ticular diatheses and individual states of body and constitution. In the classification of agues the *third* variety was that "with exhaustion of the powers of life, or with *typhoid* symptoms"; the fourth associated with disease in some internal viscera. In the classification of *remittent* fever the fourth variety was "the malignant, or remittent with *typhoid* symptoms". Mark the expression—*typhoid symptoms*. Of *continued* fever three varieties or forms were enumerated—namely, 1. The inflammatory; 2. The bilious inflammatory; and, 3. The malignant, or *adynamic*. The circumstance was recorded that "in the more malignant kinds of fever the spleen is often observed enlarged and softened; the duodenum, jejunum, and ileum, especially the duodenum and termination of the ileum, are frequently diseased in their mucous surface, which is inflamed in patches". "In several instances the ulcerations (at the termination of the ileum), which sometimes are large and far apart, at other times small and agglomerated, have nearly or actually penetrated the tissues of the intestines. Morbid appearances such as these are generally found in cases of fever—that is, *endemic* fever—in which diarrhœa and dysentery *supervened* (observe the expression *supervened*), and which in their progress assumed an *adynamic* or malignant form."

b. More recent.—Still more recently, we have the views expressed by medical officers who have enjoyed ample opportunities of comparing the opinions already enumerated, and of considering, in reference to them, individual cases and more general outbreaks occurring within their own cognisance. Among the views thus formed are the following, namely: "When agues and remittent fevers in India terminate fatally, unless that happens by sudden supervention of cerebral symptoms, to which the term heat apoplexy is usually applied, it is by their running into the continued type, and assuming symptoms to which the designation typhoid is usually given." "In fact, the tendency seems to be—to return all cases of fever that die as cases of enteric fever, and those that recover as examples of agues, continued, or remittent fevers." "In all deaths happening early in the disease, cerebral effusions, congestions, etc., will be found to predominate; whilst, in those occurring later in its course, it will be the enteric (that is, intestinal) lesions that are the most marked." On these points, it appears desirable to remark that the conclusions thus expressed occur in more detailed form in the reports before us, and are the result of inquiries officially conducted by a highly qualified medical officer, viz., "That the expe-

rience of British troops in India does not support the conclusion that it (enteric fever) is an affection dependent for its propagation on poisoning of a specific faecal character", although the circumstance nowhere meets with denial, for the reason, apparently, that it is undemonstrable that under certain circumstances, a specific fever, having the main characteristics of typhoid or enteric in Britain, may owe its origin to pythogenic causes. This may be so, notwithstanding that of upwards of 175 cases, details of which are given in the two special reports before us, in not one was the disease so named traced to such a source, even by the medical officers reporting them.

With reference to cases of fever, resembling in their phenomena those of the specific form just alluded to, the question has been asked—Is this the same disease which might be contracted in London, Dublin, Windsor, or elsewhere, from a water-closet, drain, sewer, well, or milk can? and, as a reply, it has been stated that "a form of fever, exactly like European typhoid, except in its etiology, exists in India, and other hot and malarious countries; and that it is due to climatic causes, not to filth or specific causes, such as give rise to it in England and elsewhere". "Fevers of malarious (or climatic) origin may be, and often are attended by such bowel symptoms as diarrhoea, hæmorrhage from the intestines, ulceration of the mucous membrane of the large and small intestines, etc.; yet in them, every attempt that has been made to trace the origin of the disease to a specific pythogenic source has failed; they generally occur in climatorial conditions of a special kind; they run a course of extreme irregularity; it is only in abdominal symptoms and pathology that these cases really resemble genuine enteric fever; the head symptoms, as a rule, differ widely from those of enteric fever." The medical officer who thus expresses himself as to the circumstances which qualify him to form an opinion, says: "I have seen a great deal of genuine enteric fever in North America and in England. My experience of Indian fevers hardly amounts to a period of four years, but the time I have doubted the nature of these so-called enteric fevers is co-extensive with my service in India, and may perhaps weigh fairly in comparison with a longer period of unquestionable acquiescence. No evidence exists of the disease having been imported from England, or from one station to another, nor of its spread by contagion; neither were the water-supply, nor any article of food or drink at fault; but the mere existence of enteric is evidence of insanitary

conditions." Such is the statement made in official reports. Such the standard adopted.

c. Present views.—Within the last twenty to twenty-five years other views with regard to the nature and etiology of fever in India have been expressed. It has been asserted that "the great prevalence of typhoid"—that is, of a specific form of fever so named, as distinguished from typhoid, as indicative of a *condition* occurring in the course of endemic or climatorial fever—"was long concealed from view behind the forms of fever which were denominated malarious; everything was at one time jungle fever", as the severer attacks of remittent fever used formerly to be popularly called; "whereas it is now perfectly well known (mark the decided nature of the expression) that a great part of the so-called jungle fever is neither more nor less than common typhoid", that is, the specific disease so named. In reference to climatic and other endemic influences, the effects of which have been acknowledged since the date of the earliest Hindoo writers on medicine, the opinion has, even within the last five years, been expressed that "among the most serious errors"—such is the expression applied to the views of all previous writers—"is the assumption" (listen to that,—assumption) "that there is a fever of the country at all—that is to say, a fever due to climatic influences, or to natural emanations from the soil, and not to conditions artificially produced by the inhabitants themselves"; the conditions thus alluded to being such as are usually comprised under the heads of defective conservancy. Can it be that the views thus expressed are those of a writer who, in his own person, has had real experience of an Indian climate? Have not the views rather an impress of home manufacture upon them? It has been said that "of late years enteric or typhoid fever has been recognised as a special cause of mortality in the British army serving in India". "It is not at all probable that high temperature will cause enteric fever, but it may so act in the body as to render the effect of known existing causes of enteric fever more intense than it would otherwise be." "The removable causes enumerated are the introduction into the system of putrescent fæcal matter. There is evidence that Indian climates, acting on young constitutions, predispose to febrile action; but there is no evidence to show that climatic influences will cause enteric fever; while, besides climate, the young soldier has to contend against local causes, which are well known to be the exciting agencies of the disease. The disease is officially described

as a filth fever. All that is required in reference to the above is a definite expression of what is intended to be implied by the name enteric, as applied to a form of fever; but this is precisely what does not appear.

These views have been very distinctly expressed by high sanitary authorities, after this manner:—"The recurrence of the typhoid fever at any station should lead to immediate inquiry as to the state of cleanliness of ground in the vicinity likely to act injuriously on the purity of the air; as to the condition of latrines and water-courses, and the condition of the bazaars frequented by men who have been attacked." All excellent precautions, but altogether passing by such conditions as obtained the notice of medical officers while the filth theory was only considered in relation to the general objection against neglect of cleanliness, and of conservancy. In those days, such circumstances as the following were looked for as causative of fever in India and the tropics generally, and hygienic measures taken accordingly; namely, in regard to youth, habit of body, temperament, exercises and duties, habits, exposure, over indulgence, and others affecting the individual; at the same time that climatorial, seasonal, and endemic influences were recognised and acknowledged. (Within parentheses let the observation be made, that these opinions here described at of the present time, are in all instances taken from the works of recognised writers and authorities on the subjects to which they refer, and from reports by official authorities. What, then, was my surprise to find this query, by a high officer, to whom this manuscript was lately submitted: "Are not these the past views?" They most assuredly are the very latest views to which I have had access; and I can now only ask the question, "If they really are the past, what are the newest new, and of course improved views, to make room for which they have been relegated to such limbo?" Do not the charts in the second report before us indicate by their zig-zags of fever lines that, while in the mass such lines show a tolerably even quantity of that particular class of disease, their individual variations occur in such a manner as, to say the least, is very remarkable, either with regard to a name, or to the actual nature of the disease to which a name is applied.)

Here is still another view regarding fever in India, so recent indeed as to have only reached us by last mail. A medical officer, whose name is given, believes that a new disease has appeared in the epidemic, at the time he wrote, in Calcutta. He believes that it is probably a description

of hungerpest, always traceable, more or less directly, to antecedent famine or scarcity, and susceptible of identification with both the continuous low yellow fever of Cormack, and the hæmogastric fever of Copland. He claims for some of the manifestations of the new pestilence all the quasi-typhoid symptoms which have occasionally been observed of late in that city; uncompromisingly denying that there is any real typhoid in Calcutta just now at all. Miasmatic poisoning from drains may, he says, be detected, doubtless; but if the symptoms of the attacks in which this causation was suspected were otherwise irreconcilable with the ordinary diagnosis of typhoid fevers, it is more reasonable to assume, generally, that other maladies may have been intensified for the time by the epidemic, than that extraneous symptoms, irreconcilable with certain diseases, were actually caused by them.

d. Deductions.—Such are some of the opposing views enumerated on the present subject, and they might be added to, did time permit. Among the questions they suggest are these:—How far do the phenomena recorded correspond with those that characterise fever purely climatorial and endemic in its nature? How far those that occur solely as a result of reception into the system of a specific poison contained in decomposing human fæcal matter? Very important issues attach to the manner in which these questions are answered. First and foremost is the particular line of treatment to be followed according to the theory of causation; then there are the means of prevention, involving, as these do, questions of public finance in connection with the destruction or reconstruction of buildings and their several appliances.

3. *Standards adopted.*—The circumstance becomes evident, during investigation of the subject, that various standards of what constitutes typhoid or enteric fever, have of late been adopted in India. Thus, according to one, the phenomena so designated are not specific in their causation or nature, but are mere accompaniments of endemic fever, whether continued, remittent, or intermittent. According to a second opinion, they do not arise from the operation of such influences, but from the presence of filth in air, earth, water, or food; when the presence of filth cannot be demonstrated, it is assumed. According to a third opinion, the presence of intestinal, that is enteric, complication in the course of any variety or form of fever, irrespective of the manner of causation, constitutes enteric fever, apparently

in the sense that the terms pulmonic, hepatic, or cerebral, might be used, in a specific sense, to a case of fever in which either of those complications was present. It is further on record, that the terms typhoid and enteric being used synonymously, the result has come to be that the former so-named condition, when present in a case of fever, is held to authorise the application of the term enteric, even in the absence of intestinal complication; and, on the other hand, the presence of intestinal complication, that of typhoid, even in the absence of a low adynamic condition to which the term was formerly restricted. In a few instances the presence of a cutaneous papular rash, rose or pink in hue, occurring in the course of a fever, was held to justify the application of the term enteric. Thus the question naturally presents itself: Wherein lies the difference between the type of fever above alluded to, and those in former years described as continued, remittent, or intermittent, with a low or typhoid condition of the patient, with or without intestinal complication; or with intestinal complication, with or without a low typhoid condition of the patient? Are not replies to such a query given by the eminent authorities quoted in the reports before us, namely: "Ulceration of the Peyerian patches is by far the most noteworthy single fact, pathologically speaking, in the natural history of enteric fever, yet it will not do on a fact like this to found in the matter of diagnosis; after you have settled that there are cases of fever with ulcerated intestines, you have still to settle whether these cases are different in nature from other cases, in many respects similar, in which the intestines are not ulcerated." And again: "Admitting that fever shows itself under various forms, the effect upon the mind of all this subdivision is bad and hurtful. It encourages a disposition, already too prevalent, to prescribe for a disease according to a name. There is no genuine distinction between continued fevers that can be relied on." A still more recent author writes after this manner:—"Continued fever frequently occurs without any organic lesion; in other cases, cerebral or pulmonic complications might furnish a specific name." He further adds: "I agree, therefore, with those who consider fever as an essential disease, dependent on some unknown constitution of the blood, and occasionally accompanied or followed by various local lesions of the cranial, thoracic, or abdominal viscera, and with various eruptions of the skin."

A sanitary authority in England writes:—"The fact is, unfortunately for the statistician, the expression typhoid

fever is not always used in the same sense by different medical men, but is occasionally applied to cases to express a generally low typhoid condition, without the specific symptoms of enteric fever being necessarily present."

Does not, therefore, the manner itself in which the terms enteric and typhoid are synonymously applied leave scope for want of precision, such as records indicate to attend their use in India?

As a commentary on the above remarks, the following occurs: "Cases of diagnosed typhoid with Peyerian ulceration would be classed with other fevers having ulceration as a 'complication' under the same head of 'enteric fever.'" Here there appears to be a standard adopted from the mere existence of "Peyerian ulceration", even occurring in endemic and climatorial fever. But how about cases called enteric, where no intestinal symptoms are manifest? How about cases of endemic fever, in which cerebral or pulmonic, or hepatic complications are present, intestinal absent? Are they to be severally named in accordance with the existing complication? How about cases of "enteric" fever in persons beyond the age during which the presence of Peyer's glands exists? How about cases of fever running into a typhoid, low typhous—not typhus—condition, but without organic lesion of any kind? We know, as a result of observations, that organic complications occur not necessarily at the commencement of fever attacks in India, but at subsequent stages of its progress.

4. *Causation*.—Among the assigned causes of specific typhoid or enteric fever in Britain and Europe generally, the following are enumerated. 1. *Emanations from sewers*. But although, in many cases, it does so, this result is not invariable; exposure of this kind may be followed, not by specific typhoid fever, but by nausea, faintness, and diarrhœa, these symptoms ceasing on their subject being withdrawn from the emanations. Among other diseases owning the same cause are diphtheria, erysipelas, plague, cholera, dysentery, yellow fever, etc.

2. *The Use of Impure Water*.—But so also are other diseases, more particularly intermittent fever, diarrhœa, cholera, and dysentery. But, on the other hand, at certain places where the water is notoriously contaminated, residents have an immunity from enteric fever.

3. *Fæcal Contamination of Air*.—That this cause operates in producing specific *typhoid* or *enteric* fever in Europe and in America appears to be placed beyond a doubt by the direct evidence adduced on the point. But such causes,

when they exist even to a great extent, are not always thus operative, as in the case of air rendered impure by decomposing bodies, putrid meat, knackeries, tanneries, and so on.

4. It has been produced by violent and continuous military exercises and the exposure connected therewith; also great cold after such exercises. According to this acknowledgment, a train of phenomena in all respects similar to those that result from a specific cause, by some writers considered to be a *poison*, are admitted to owe their causation to conditions of the body itself, and to those of the surrounding atmosphere. And yet the power of other atmospheric conditions, such as exist in India, also to cause the like phenomena is denied, as we have already seen. Is it not the case that even here in England "all professional men are not yet agreed as to the real cause of enteric fever; also that the causation is so little understood, that it gives us no help in the diagnosis"? But with regard to a form of fever, the definitions of which vary among themselves, and the causation of which is still undecided, so long as we depart from generalities and individual conditions, inquirers in India whose inquiries have failed to demonstrate certain specific causes of what has been indicated to them as a specific disease, have had very severe expressions applied to them. Meantime, however, their views are leavening opinion at home.

a. Commentaries.—In reference to this part of the subject the following extract from remarks on enteric fever by a well-known English author seem appropriate. He had previously held to the doctrine of an imperative necessity for the specific poison being imported into the body. His subsequent experience, from certain seeming illustrations and circumstances, has gone to confirm the belief that under special and peculiar conditions enteric fever may become instituted in the system without any external agencies other than such common causes as give rise to that lowered tone of vitality which favours the springing up within itself of the morbid phenomena in question. According to another equally eminent authority, "specific causes are not in all cases required in order to produce an attack of fever; changes may take place spontaneously in one or more of the functions, and proceed to give rise to the worst forms of fever". "That such is the case", he adds, "appears to be fully proved; also, that the existence of the condition described as *epidemic constitution* is important in connection with the causation of fever."

The best instance of the inefficiency of sewage decomposition to produce enteric fever is that of the Thames in 1859. "For the first time in the history of man the sewage of nearly three millions of people had been brought to seeth and ferment under a burning sun in one vast *cloaca* lying in their midst. Stench so foul as never polluted this river air; river steamers lost their accustomed traffic, and travellers pressed for time made a circuit of many miles rather than cross one of the city bridges." With all this condition of the Thames the health of the metropolis was remarkably good, and *enteric fever actually less than usual*. Is it therefore to be wondered at that the reporting medical officer should thus express himself. "As regards enteric fever, and probably other contagious diseases—to wit, diphtheria, *we do not think that the filth and drain theory will stand.*" Please to observe this is not my language; it is that of an eminent English physician, and leading authority in regard to our present subject.

While the present paper was in course of preparation, a communication to you, from a recognised authority on the subject of fever in Britain, was through your courtesy placed before me. The writer of that communication wrote thus:—"I have devoted some time to the study of the etiology of typhoid fever, and I have come to the conclusion that the worst cases in which it is ascribed to filth, it is in most cases wrongly so ascribed. I do not believe that there is any necessary connection between filth and enteric; and, indeed, I doubt if there be any at all. At the same time, I would not like to say that any kind of filth might not contain enteric poison. The filth theory is really due to a name; and, after a very anxious consideration of the evidence in favour of it, I have come to the conclusion that there is really none worthy of the name. The same may, I think, be said of drains, milk, and water supply. Some of the most recent of these are ingenious, and to *devout* believers, no doubt, satisfactory; but I am heterodox enough to doubt the whole thing." "I think you maintain a climatic origin—that is, Trousseau's view, age, climate, and overcrowding, and I don't think that we have got beyond that yet."

b. Results in Madras.—In Madras, pythogenic causes are for the most part non-existent; and in the few in which they are present, inquiries show that they were inoperative. Thus in only a very small number of stations do sewers exist, and where they do, no case of *specific* fever has been traced to their presence. Diarrhœa and dysentery are by

no means seldom traced to the use of water contaminated by decomposing animal matters, and malarial fevers to the use of waters in certain districts similarly contaminated by decomposing vegetable matters. At certain Hill Stations such a connection between a particular kind of diarrhoea and water rendered impure by fæcal matter was acknowledged to exist; but of the whole number of cases recorded in the reports before us, as a matter of fact no such connection was demonstrated as existing between the cases recorded as of enteric fever and contamination of the water. As regards contamination of air by fæcal matter at one station, where an outbreak of so-called enteric fever took place, the troops occupying a range of barrack rooms side on to, and more directly exposed to emanations from latrines, suffered in a less degree from the prevailing disease than did those in barrack rooms placed end on to the same latrines, and also to the prevailing winds. In the one case there was through and through perfilation; in the other the ventilation was less complete; in both, the soldiers were, for the most part, young lads, brought rapidly from Ireland to the hot damp climate of Malabar, at a season when malarious fevers were unusually present even among the native population. In the second instance, the atmosphere of the place was extremely offensive at times, yet no case described as "enteric" was recorded during the period embraced by these reports. According to replies by medical officers, in no case was so-called enteric fever actually traced to food or milk used by them; nor must the circumstance be lost sight of, that while soldiers' wives and children, who use bazaar milk in large quantities, enjoyed very great immunity from the disease so-called, the young soldiers, who used comparatively little milk, furnished the bulk of the cases. As to the disease being caught in the bazaar from the use of contaminated milk or water, it only needs to be observed that the purpose for which the British soldier visits a bazaar is other than to indulge in milk and water.

5. *Phenomena*.—A particular train of phenomena is held to characterise specific enteric fever. But according to works on the subject referred to in the Reports before us, such phenomena are not always present in their entirety in the specific fever itself, but some or all of them are so in the course of fevers in India distinctly due to climatorial and endemic causes, and also in some other diseases than fever, both in that country and in this. *Tympanitis* occurs not only in specific enteric fever, but also as a serious complication in a variety of diseases. Abdominal tenderness

in fevers from non-specific diseases, gurgling in the right iliac region in diarrhœa, also from non-specific causes, end in dysentery; diarrhœa, absent in eleven cases out of sixty-two of specific pythogenic fever, occurs in fevers of non-specific origin, climatorial and otherwise. In the *jail* distemper, which prevailed in the middle of the eighteenth century in England, "an offensive diarrhœa brought numbers to their end". Hæmorrhage, by no means constant in occurrence in specific enteric fever, takes place in adynamic or typhoid dysentery; in the more dangerous seizures of remittent fever in tropical countries generally; in cases of inflammatory fever, formerly known as *synocha*, and more recently as continued fever; and so, epistaxis and intestinal hæmorrhage are recorded as occurring in the course of fever attributed to the use of tainted veal and sausages.

6. *The Temperature* line in typhoid fever is said to run such a typical course, with regular diurnal variations, with so steady a rise to the fastigium, and decline to the deferescence, that from a mere inspection of the chart, we can generally diagnose the disease. As a matter of fact, in three so-called typical charts, extracted severally from the works of three recognized high authorities, the line markings differ from each other absolutely in character; in those having reference to cases of so-called enteric or typhoid fever in India, fac-similes of which are given in the second report on the table, their several characters are so various that it does not appear practicable to draw conclusions from them. One of the older Indian medical officers, many years ago observed, with reference to temperature in endemic fever of that country, that "it is well to distinguish between *heat* or symptom, and the *disease* fever". Is there not reason to believe that temperature, in a case of fever said to be enteric, is, at the present time, by some observers at least, alluded to as if it were itself principally, if not altogether, the disease, instead of being one among others of its phenomena?

7. *Cutaneous Eruption*.—According to a number of English writers, the presence of a specific eruption is considered to be characteristic of enteric or typhoid fever. Some also believe that such eruption is found in no other disease except enteric fever. A very eminent physician and writer observes that in four years he never saw a single exception to the rule that rose spots are diagnostic of typhoid fever, that is to say, of an affection having for its anatomical character disease of Peyer's patches. That is his

standard of the disease so called. On the other hand, according to reports before us, a very eminent French authority, while disagreeing with those who hold that such eruption is specially characteristic of the disease, nevertheless considers this eruption of very great importance in its symptomatology. In Paris it is said to be always found, while in some other cities it is entirely wanting in different epidemics. Even in the same epidemic it is not always present. Rose spots occur in other forms of fever than specific enteric; in America their presence is recorded in cases of purely malarial fevers. In England, a well qualified author writes thus regarding enteric fever: "If you rely on the characters prominently given, and especially with regard to the eruption, it must be evident you will be frequently deceived." An eruption, similar in character to that of specific enteric fever, has been recorded in connection with sausage poisoning and trichinosis. With regard to India, we find the circumstance recorded that the presence of eruptions on the bodies of men suffering from any form of severe disease during the hot weather is the rule, and it is during the autumn months that the most serious forms of fever occur. In the Reports before us, we find various forms of eruptions noticed as occurring in fatal cases of fever, said to have been enteric, and also in those that recovered; some of the eruptions being severally described as typhoid, rose eruption, lenticular spots, characteristic, suspicious spots, measles eruption, and so on. In the first of the Reports on the table there occur details of fifty-four fatal cases of so-called enteric or typhoid fever. In twenty of that number an eruption of some kind was noticed as being present; in twenty-seven no eruption was present; and in seven, particulars are not sufficiently detailed to render it clear whether an eruption was or was not present. Of the twenty cases in which an eruption was present, ulceration of Peyer's glands existed in eleven, or 55 per cent.; ulceration did not exist in three, or a ratio of 15 per cent.; and its presence or absence was unrecorded in six, equal to 30 per cent. In the twenty-seven cases in which no eruption existed, ulceration of Peyer's glands was present in sixteen, or 59 per cent.; there was no ulceration in eight, or a ratio of 29 per cent.: in two cases, or 14 per cent., ulceration affected the ileo-cæcal valve alone, and in one case, equal to 7 per cent., no record appears as to the presence or absence of ulceration. In the seven cases in which the presence or absence of eruption of any kind is unstated, ulceration of Peyer's patches was

present in four cases, or a ratio of 57 per cent.; not present in one, or 14 per cent., and unrecorded in two, equal to 28 per cent. So far, therefore, as these particulars indicate deductions, they are, that in the cases of Indian fever referred to, no special connection was traceable between the presence of cutaneous eruption and the existence of ulceration of Peyer's glands; also that the cutaneous eruption, when present, was different in its character in different cases. Is not then the conclusion to be drawn from these particulars, that with regard to the cases, details of which are given, neither is the presence of an eruption to be held as distinctive of specific enteric fever, nor necessarily of the existence of ulceration in the aggregate glands of the ileum?

8. *Duration of Attack.*—Of a series of cases of enteric or typhoid fever in England, the duration of the disease was 12 days in 1 case; 14 to 21 in 19; 22 to 28 in 40; 29 to 30 in 9; above 30 in 6. In the outbreak at Clapham, some cases were fatal in less than four days. According to a high authority on the subject, the average duration of the disease is twenty to thirty days. Of 255 cases recorded in Massachusetts, the average duration was twenty-two days; according to another authority, the average in the same province was thirty-nine days. How far in such instances the doctrine of averages is really suitable may be a question; but as averages are drawn, such are the results indicated by them; the results being that no definite rule can be said to hold in regard to the length of time a case of typhoid fever, as at present defined, may be expected to continue. Of the 175 cases related in the first of these Reports on the table, the following is a summary of results regarding their duration, namely, first, with regard to those in which recovery took place, the duration of the attack in one was seven days, in another 105; between these limits there was great variation, according to station, but for the purposes of this paper they are considered in the mass, and according to the order followed above. Thus, in three cases, the duration was under fourteen days; in 4, between 14 and 21; in 8, from 22 to 28; in 5, from 29 to 30, both inclusive, and in 72, above that period. In the mass, the average duration, arithmetically expressed, was forty-five days; but at different stations, the averages varied thus: 11 at Kampter; 24 at Thyet Myo; 38 at Cannanore; 40 at Wellington, a hill station; 43 at Maliaporam; 55 at Bellary; 56 at Bangalore; 60 at St. Thomas's Mount, and 84 in the Andamans. With regard to the fatal cases, two occurred

in one day of illness : 2 in 2 ; 4 in 4 ; 1 in 5 ; 2 in 6 ; 4 in 7 ; 3 in 8 ; 1 in 9 ; 4 in 10 ; 1 in 11 ; 2 in 12 ; 1 in 14 ; 3 in 15 ; 2 in 16 ; 2 in 17 ; 1 in 18 ; 1 in 25 ; 1 in 29 ; and 1 in 35 ; thus giving an arithmetical average for the whole of nine days. A similar analysis of details contained in the second Report indicates, with regard to the eight cases in which recovery took place, that the limit of duration ranged from eighteen to eighty-six days ; that one was within the period, as above, of fourteen to twenty-one days ; one from 22 to 28 ; one from 27 to 30 ; and six beyond that period : the general average of all, thirty-four days. Of the eight fatal cases there recorded, one occurred in two days of the attack ; 1 in 9 ; 1 in 10 ; 1 in 18 ; 1 in 19 ; 1 in 34 ; 1 in 36 ; and 1 in 68 ; general average, 24. In the several classes of cases enumerated, the nature of illness is considered to have been endemic and climatorial ; in them the variety in persistence was equally great as in specific enteric ; nor must it be omitted to be observed that in this respect locality, and, no doubt, treatment, had their influence.

9. *Pathology.*—Induration, and at a later period, ulceration of Peyer's glands and solitary glands in the ileum, are described as constant in, and peculiar to, enteric fever ; and as constituting "the anatomical sign of typhoid fever" ; also that such conditions may extend to the solitary glands in the cæcum and ascending colon. This ulceration is described as specific in character, and even as constituting the special intestinal eruption of specific enteric fever. But other authors are of opinion that pathological conditions undistinguishable from those which occur in specific enteric fever, occur also in the course of endemic fevers more specific in their nature ; and in this sense they were noted by the older medical officers in India in connection with intermittent and other forms of endemic fevers. It is asserted that the typhous, that is, typhoid process, is purely artificial ; that in a case of typhoid or enteric fever, the ulcers in both small and large intestines were undistinguishable from dysenteric ulcers ; that precisely similar conditions occur as results of poisoning by arsenic and *cicuta virosa*, poisonous mushrooms and colchicum ; that they have been observed also in typhus ; that they occur in cases of ordinary climatorial fevers in India, in cases of protracted cholera, and in enteritis ; that in such they are no more than incidental occurrences. That such lesions in the cases alluded to are mere incidental occurrences is indicated, according to some writers, by the circumstance that they only take place

in the advanced stages of the fever, not in the early stages ; that a disease having all the characters of specific enteric fever occurs in persons of an age beyond that when Peyer's glands exist ; and, moreover, that such changes also occur in adynamic and malignant fever, even to a greater degree than in enteric—particularly such as are of malarial origin ; a similar result takes place in hectic fever. What was formerly designated glandular enteritis, was described as taking place consequent upon fevers, or during convalescence from them ; also as “endemic in some countries, partly owing to high temperature in connection with humidity of the atmosphere, partly to miasmata”. Such changes were said to occur in fever generally. Lesions of the same kind, occurring in the same organs, are more frequently met with in hot climates than in temperate ; in these the mucous membranes, Peyer's and Brunner's glands, the brain and lungs, are chiefly affected. With reference to Peshawur fever, it is recorded that experience has taught that anatomy is not always to be trusted as a guide to the cause of death ; that very similar textural changes are often produced by widely different systemic diseases. A very eminent physician thus wrote in 1832 : “Morbid appearances found after fatal fevers are often observed to be remarkably various, even in cases the leading symptoms of which are nearly the same, and they are far from bearing any fixed proportion to the intensity of the symptoms of affection of the parts in which they are found.” An army medical officer, of great and varied experience, wrote thus with regard to the morbid appearances in fatal cases of yellow fever : “Slight ulceration of the lower parts of the ileum ; severe ulceration of the large intestines, as in chronic dysentery ; perforation in the lower part of the ileum, large ulcers in the same part ; small perforation in the upper part of the ileum ; Peyer's patches enlarged ; several deep ulcers in the lower part of the same intestine ; the lower part of the ileum studded with ulcers.” In continued fever, non-specific in character, the same writer enumerates small ulcers in the ileum, cæcum, and colon ; spleen soft ; numerous small ulcers scattered through the ileum.

From the data thus summarised then, I hold that the conclusions expressed in the Reports on the table are supported by evidence ; namely, that pathological conditions, now stated by some writers to be characteristic of, and confined to a fever resulting from a specific cause, namely, filth, exist also in fatal cases of various forms of disease,

specific and non-specific, occurring in tropical and sub-tropical countries; and that, therefore, in such instances, to apply to the disease in which they occur a term having reference to the existence of a particular condition, as resulting from non-specific causes alone, is inappropriate and misleading.

10. *In relation to Season.*—According to former writers, thirty-five years ago there was no evidence of intestinal disease in the continued fevers of London, except in autumn. Most of the outbreaks in English towns and villages, during the last thirty years, have occurred in autumn; and the belief is entertained that the autumnal fever of last century, in Britain and Ireland, was the same as that to which the name enteric fever is now applied. In the colder months of the year, there is greater risk of inflammatory complications of fevers; in autumn we look more for diarrhoea or dysenteric complications engrafting themselves on the disorders; when the air is close and foul, the symptoms show a much greater tendency to the typhoid type.

Turning to India, official reports state that in 1872, “the occurrence of enteric fever in India was clearly related to season”. “Between the middle of August and end of September, cases occurred at stations all over India; and they were accompanied by other cases of purely climatic nature.” As in this country, therefore, season is admitted to influence the occurrence of fever attended by bowel complication, so the above-noticed circumstances render the fact evident that in India a similar rule holds good.

11. *Climatic Influences and Malaria.*—Inasmuch as the *fauna* and *flora* of localities are affected and modified by climatorial influences; as the constitution of man is similarly affected, so it is admitted by medical officers and others who travel extensively, that the phenomena of disease are thus modified. According to them, “each country has its own particular type of fever, depending, more or less, upon physical causes, and requiring certain modifications in the method of treatment”. According to others, infraction of Peyer’s glands is endemic in some countries, partly owing to high range and daily vicissitudes of temperature in connection with great humidity of the atmosphere, and partly to miasmata. In India, at a particular station, during the same season of the year, among the same body of men, under similar circumstances, different forms of fever at times prevail, namely, intermittent, remittent, and continued. Such forms are by certain medical officers looked upon, under such circumstances, as one and the same disease, dependent upon the effects of heat,

moisture, atmospheric electricity, and ozone. All forms of fever in India, under certain conditions of person, climate, and locality, become adynamic, low, or typhoid, whether at the most they are intermittent, remittent, or continued; also, in that adynamic state the danger to life is the greater, in proportion to the extent of affection of internal organs, whether abdominal or cerebral.

The circumstance is well known in India and other tropical and semi-tropical countries, that the term malaria, besides signifying marsh miasm, is applied to otherwise undefined influences, existing in localities and in geological formations incapable of yielding miasm of that nature; also that in such localities and on such geological formations, forms of disease in all respects similar to those which occur where miasms prevail, also present themselves. Among them are hepatitis, dysentery, remittent and intermittent fever, and so on. Hence, in India, the expression malaria can only be accepted as a synonym of climatic influences. Even the chief advocate of the pythogenic theory of enteric fever admitted that there exists an analogy in many points between it and diseases acknowledged to be malarious. The occurrence of malarious fever in epidemic form at Indian military stations is acknowledged as a fact, and especially among the more recently arrived; also that the type is rendered more severe, according to the unhealthiness of the station, and of the season. In them, according to former writers, "the visceral disease ought not to be viewed as the immediate cause of the febrile excitement; or, in other words, that the fever is merely a general disorder supervening to a disease of a particular organ; on the contrary, the exciting causes of fever produce disorder of the frame generally, which, owing to the predisposed state of certain viscera or textures, occasions a permanent derangement in them, and as we have just found it asserted, such a predisposition or tendency exists in the glands of the ileum. The effect of influences of this nature was thus acknowledged by the Royal Commission on the state of the Army in India, 1863, namely:—"By far the larger proportion of mortality and inefficiency of that army has arisen from endemic diseases, and notably from fevers, diarrhœa, dysentery, and diseases of the liver; the predisposition to these diseases is, in part, attributable to malaria, in conjunction with extremes of temperature, moisture, and variability"; that is, to local and climatorial conditions. Nor is it alone upon man that such influences exert their action. Thus, in the Rohilcund terai, in the valley of Dhera Dhoon, herds of domestic cattle are, from time to time, carried

off by deadly fever, and are, for the most part, subjects of splenic disease and cachexy. Imported animals into India suffer from endemic diseases, and die by them, in even equal, if not, indeed, greater proportion than does man; imported plants droop and die, or become, to a greater or less extent, changed in their characteristics. In the very latest official report available while preparing this paper, the following remarks occur: "If the facts point in the direction of any efficient predisposing cause, it is to newness of climate and malaria, acting on new arrivals and immature constitutions." "After 20th April, in any locality, too much care cannot be taken of new regiments; for it is in this week that exposure is very certain to be followed by the appearance of fever; and again, the tendency for the fever to reappear towards the close of the monsoon season must be kept in mind." "The fever is chiefly due to climatic conditions, acting on special constitutions."

Is not, therefore, the fact rendered evident by the above, that the pythogenic theory of fever in India has been abandoned by the authority referred to, also that the endemic and climatorial has been accepted in its stead; in other words, that the views entertained by the older medical officers have once again been received into favour? This being so, where is the propriety of retaining a name applied in accordance with a theory now found undeserving of continuance.

12. *In relation to age.*—In England, the age of greatest liability to enteric fever is 15 to 25; the next from 25 to 30. But a case is related in which a child died of the disease so named on the eighth day after birth, although its mother had not the disease, either during pregnancy or after confinement. Fatal cases are recorded in persons aged 60, 75, 83, and 87 years. Thus, on the one hand, such cases occur before the aggregated glands have attained their full development; on the other, after that in which their activity has ceased. In India, the relation of endemic disease generally to age corresponds pretty closely to that of typhoid fever in Europe. The circumstance that mortality from all such diseases fell heavier on the young and recently arrived soldiers than on the older ones, was often recorded by the medical officers in former times; young soldiers, in larger proportion than ever, are being sent to India, and the high rate of mortality among them, not alone by fever with intestinal complication, but by fever without such complication, and by other forms of endemic disease, is still being noticed and discussed. But the system continues.

13. *With regard to New Arrivals*, the observation occurs, that recent arrival in India and youth are usually coincident in the same individual; they thus exert their double influence as predisposing causes of climatorial disease; to them also must be added inexperience and indiscretion on the part of individuals, leading to acts of exposure to exciting causes of illness that are avoided by older residents. Many years ago, the circumstance was noticed and dwelt upon by medical officers, that new arrivals in India from temperate climates manifested a peculiar liability to be attacked with fever; that all Europeans require to be seasoned; and, in fact, in the West Indies, and on the West Coast of Africa, the term "seasoning" was formerly, and may still be, applied to the first attack of this nature. It was considered that this process was necessary before individuals came to that state of health best suited to a tropical climate; it was added, "the full, warm, generous state of body which belong to a temperate climate are not suited to a tropical climate, and Europeans arriving in that state are always brought down, often through some severe illness; but whether they have illness or not, they always alter, and it is necessary they should alter, in order to give them a chance of preserving their health in that climate." Thus the natural inference is, that in the one set of cases the seasoning process takes place as a violent cataclysm; in the other gradually, and without such extreme systemic disturbance. In the case of soldiers, the former is indicated as being the process of more frequent occurrence. According to official reports for 1874, of sixty-nine fatal cases of enteric fever, forty-seven of its subjects had been less than ten months in India, and only six over four years. But by the same record it is shown that this rate of mortality is not limited to what is called enteric fever; that out of 453 deaths, 120 took place in men of less than one year's service in India; in fact, that the relation of this mortality coincided with that of fever generally.

14. *Views of Medical Officers.*—Various comments were made by medical officers in regard to the conclusions expressed in the first special report now on the table. A summary of at least some of the views expressed in those comments indicates the following results, namely: 1. That "typhoid fever" is said to be "a perfect misnomer". 2. The theory of dirty localities is good, but the writer does not agree with this as an originator, though that dirt will develop any disease is undoubted. 3. There is evidently great obscurity as to the nature of typhoid fever, for we see

diseases of a totally different character, cholera, for instance, attributed to the same cause. 4. In many cases the simple continued fever seems to merge into the remittent, and *vice versâ*. 5. There is no doubt that malaria has done its share in producing fever. 6. That all fevers with infiltration of mesenteric and Peyer's glands, with elimination by ulceration or otherwise, as evidenced during life by diarrhoea, character of the stools, tympanitis, gurgling, high temperature, more or less stupor or delirium, are decidedly enteric, and that the cases called intermittent, remittent, and continued have been improperly classed. 7. That the writer does not mean to say the fever is not considerably, often it may be entirely, produced by climatic or malarial causes, but that the disease is one and the same as enteric at home he firmly believes. 8. It is thought to be an open question if it should not be called by some such name as tropical enteric in place of simple enteric. 9. That the circumstance of a patient convalescent from fever losing the hair off his scalp indicated that the nature of the fever from which he had suffered was enteric. 10. That the older writers on the disease wrote at a time when the identity of enteric fever was unknown, and that, therefore, it is not unreasonable to suppose that had they been acquainted with what has since been established, they would have considerably modified, if not altogether altered their opinion as to the etiology of this disease. 11. The poison, the manifestations of which present that group of symptoms called enteric fever, and which in fatal cases is invariably found associated with lesions in Peyer's patches and mesenteric glands, is as distinct and separate as any of the other animal poisons which produce specific results, such as small-pox, measles, scarlet fever, etc. 12. That wherever you find after death ulceration of the agminated glands of the lower third of the ileum, the disease is almost always one of enteric fever, whether the cause has been ascertained or not.

Thus, the inference appears to be in accordance with the summary given, that with regard to the several points referred to by medical officers, very different, if, indeed, not opposing opinions are entertained among themselves; also that differences of opinion exist with regard to causation, phenomena and pathological conditions in connection with what is termed "enteric" fever; while in regard to not one of the points enumerated is there concurrence of opinion.

15. *Conclusions.*—Finally, in a review of what has now been adduced, the following conclusions appear justifiable, namely: 1. That a form of fever attributed to endemic

causes, presenting similar phenomena to that now called synonymously typhoid or enteric, was described by ancient medical writers of India. 2. That more recently, the older medical writers described similar lesions to those now stated to constitute a specific form of fever, the result of filth received into the system, as being complications of endemic and climatorial fever; also, that the expression typhoid was used by them as indicating a particular *condition* of the patient, occurring in the course of fever, whether intermittent, remittent, or continued in type; not a form of fever specific in itself, and due to specific causes. 3. That the experience of British troops in India does not support the conclusion that the form of fever to which in recent times the term enteric has been applied, is dependent for its propagation on a poison of a specific faecal character. 4. That a form of fever, like that which in Europe is called typhoid, except in its etiology, exists in India and other hot countries; that in them such a fever is due to climatic influences, not to filth or other specific causes; that all attempts made to trace any of 175 cases recorded to such causes, have been unsuccessfully made. 5. Various standards are adopted of what, by different individuals, is held to constitute the disease named by them typhoid or enteric fever. 6. The use, synonymously, of the terms typhoid and enteric, leads to the result that two different sets of conditions are thus brought under one heading, whether they happen or not to be united in the same case. 7. Neither of the recognised causes of specific enteric fever which are enumerated invariably give rise to that disease, nor is enteric fever the only form of disease that is induced by those causes, when they do operate. 8. Similar phenomena to those that arise from a specific cause are acknowledged to arise also as a result of fatigue, exposure, cold after exertion, etc. 9. But even in England all medical men are not yet agreed as to the cause of enteric fever. 10. A recognized authority on the subject makes this statement: "I do not believe that there is any necessary connection between filth and enteric fever, and, indeed, I doubt if there be any at all." 11. In Madras, pythogenic causes are, for the most part, non-existent, and where present, are inoperative, at least in so far as the cases recorded in the reports before us are concerned. 12. That in no instance among those recorded was an attack of so-called typhoid or enteric fever traced, by reporting medical officers, to the operation of a specific cause, either in or around their barracks, or in the bazaars frequented

by the men. 13. The phenomena, considered by certain writers to be distinctive of typhoid or enteric fever, have not been present in their entirety in the cases said to be of that disease. Some, or all, such phenomena occur in the course of other diseases, both in Britain and in India. 14. In three so-called typical charts, severally extracted from the works of recognised authorities on enteric fever, the line markings differ from each other absolutely in their character; similar differences occur also in the temperature charts attached to reports of particular cases described as of that disease. 15. In the cases recorded of so-called enteric fever in Madras, different kinds of eruptions occurred; but their relation to disease of Peyer's glands was not demonstrated by statistics. Also, eruptions precisely similar in nature occurred in other forms of disease, and in the absence of any apparent disease whatever. 16. The period of duration varies greatly in cases of specific enteric fever. Similar and equally great variations are observable in cases of endemic and climatorial, but otherwise non-specific, fever in India. 17. Specific pathological conditions of Peyer's glands and of the mesenteric glands are described as constituting the distinctive character or *essence* of enteric fever. According to other authors, conditions undistinguishable from those found in the bodies of persons who have died by specific typhoid or enteric fever occur also in those who have died by other diseases and by certain poisons; also, that cases of *typhoid* or enteric fever are recorded as occurring in persons at an age beyond that in which Peyer's glands are present. 18. Specific enteric fever in Britain prevails chiefly in autumn—that is, during the season when diarrhœa is most prevalent, and in which what was formerly called autumnal fever was chiefly observed. In India, ardent fevers chiefly prevail in the dry hot season; those with intestinal complications during the hot and moist period of the year. 19. The fauna and flora of particular districts are admittedly modified by climatorial and other influences affecting the locality. As pathological conditions, infraction of Peyer's patches is considered to be endemic in India. 20. The expression "malaria" is in these reports employed as synonymous with endemic and climatorial influences. 21. Imported animals into India suffer equally with if indeed not to a greater degree from those influences than does man. 22. In Britain, cases of "enteric" fever occur chiefly during youth and early manhood. In India, the relation of endemic disease generally to age corresponds pretty closely to that of "typhoid" fever in Europe. 23. New arrivals in India are specially liable to

be attacked by what has been termed "enteric" fever. But so also are they in regard to other forms of fever, and also by other endemic forms of disease. 24. According to the *résumé* of views already given from reports by medical officers, the opinions severally expressed by them are in absolute disagreement as regards every point touched upon having reference to what is termed "enteric" or typhoid fever in India, including definition, causation, phenomena, and pathological conditions. 25. But *if* in Britain such phenomena and pathological conditions are due to the operation of filth causes on the system, and *to none* other, the evidence adduced is amply sufficient to justify the conclusion that precisely similar phenomena and pathological conditions occur in India as results of endemic and climatorial influences operating on particular states of the system in individuals; and that those influences are of themselves alone amply sufficient for their causation.

Such, then, is the summary of views it has been my privilege to lay before you; such the conclusions I have drawn from them. If, in the comments that may be made on these remarks, any points still obscure shall have light thrown upon them, I trust that the paper now read may result in good, not only with regard to the purely professional points noticed in it, but also with regard to the well-being of our soldiers in India.
