IS ENTERIC FEVER EVER SPONTANEOUSLY GENERATED?*

By CORNELIUS B. FOX, M.D., M.R.C.P. Lond., Medical Officer of Health for Central, East, and South Essex.

THIS question, which is introduced to the Public Health Section of this great gathering of medical men, is one of the highest importance, not only to the profession of which I am proud of being a humble member, but also to the public at large. It cannot be wondered at that, amongst the profession, especially that branch of it engaged in the prevention of disease, this debatable query should eclipse perhaps every other one in interest, when it is remembered that enteric fever is as preventable a disease as small-pox, and that 140,000 cases of it occur annually in Great Britain, of which 15,000 prove fatal. To the public, whose attention has been particularly directed to this disease from its being (although declared to be a filth-disease) a scourge of royal families, attacking the prince as well as the peasant, it is an inquiry regarding which considerable surprise is often expressed that a satisfactory answer has not yet been arrived at. To that branch of the public which may be called the scientific public, the question opens up the very large one of Darwinian views and special creations. The profession has been divided into two distinct classes on this point. Amongst those who believe in the spontaneous origin of the disease we find the names of Trousseau, Murchison, Piedvache, Wood of the United States, Jacquot, Niemeyer, Guy, Bryden, Greenhow, Griesinger, Liebermeister, Hudson, and A. P. Stewart; whilst the distinguished President of this Association Sir R. Christison, Dr. Hughes Bennett, Professor von Gietl, Bretonneau, Gendron, and Dr. W. Budd, and last, but not least, the eminent outsider Professor Tyndall, are more or less sceptical as to its possibility. The limited space of time during which I have the ear of this section compels me to confine myself strictly to the point raised by my question, and to avoid touching more than is absolutely essential on that part of the subject bearing the closest relationship, viz., as to the causes of enteric fever. This restriction is necessitated on account of the vastness of the literature of enteric fever, respecting which there has, I am sure, been enough written to fill a capacious library.

I do not propose, in the following remarks, to give a definitive answer to the question before us, which is one *sub judice*; but I would indicate the conclusion to which my experience of nearly twenty years as a medical man points, and desire to invite every one present to give by an affirmative or negative answer the opinion to which each has individually been led. It will be thus seen that my object in bringing this subject forward is rather to court the declaration of the views of the medical men collected here from all parts of the country, than with the hope of throwing any additional light on a very intricate point.

All physicians, and especially health-officers, must be often struck by the difference which exists in the degree of contagiousness of the acute specific diseases. There is rarely any difficulty experienced in tracing outbreaks of small-pox, scarlet fever, or measles to their respective sources. They are all highly communicable diseases. I remember once, and once only, that I was perfectly unable to account for the occurrence of a case of scarlet fever in an isolated place. On reflecting on this case, which I often have done, I have always been disposed to ascribe the failure to a want of sharpness and diligence in searching on my part. Typhoid fever, diphtheria, and erysipelas are representatives of the opposite class of the acute specific diseases; namely, of those which possess a limited power of propagation. Although communicable from the sick to the healthy, cases of these diseases are continually cropping up in different parts far away from one another, where no connection can be traced to a prior case. As regards enteric fever, although this disease is undeniably possessed of contagious properties, numbers of single cases have occurred and been recorded where it has been quite impossible to discover any cause in the shape of a pre-existing case. Those who advocate the sole origin of enteric fever by contagion imply that the failure is due to the want of expertness and dexterity of the health officer. I most thoroughly echo the words of Sir William Jenner, who says:—"My own prejudices are greatly in favour of the specific origin of this in common with all contagious diseases. I have long advocated their specific differences, and that each has its specific cause, *i.e.*, a cause which is unable to produce any other acute specific disease. If each could in every case be referred to emanations from those previously sick of the same disease, it would tend greatly to strengthen the general views I have long held and advocated. I am prejudiced, therefore, in favour of this opinion. I

hope it is true; but then I must say that at this moment the weight of evidence and argument is rather on the other side." (Etiology of Enteric Fever, *Lancet*, February 20th, 1875.)

A great number of cases have been carefully observed where no connection could be traced to pre-existing cases, with which all medical men are familiar, such as the "Westminster School Fever", the "Clapham School Outbreak", the Peckham Police Station Outbreak", the "London Convent Cases", the "Donaldson's Hospital Outbreak", Dr. MacLagan's isolated case near Dundee, etc. Sir William Jenner has suggested that the best mode of settling this question is to thoroughly scrutinise every isolated case that occurs in out-of-the-way country places. In accordance with his advice, I beg to record a number of isolated cases of enteric fever which I have investigated. As the limits of this paper forbid the description of each of the cases, I must content myself by giving a summary of them, and a brief sketch of one or two of the most interesting.

Isolated Cases of Enteric Fever.

No.	Initials and Reference in Visitation Books.	Traceable or not to Pre-existing Case.	Insanitary Conditions observed, etc.
1.	C., No. 1, Writtle.	No.	Privy stench; dirty pond-water drunk.
2.	R. S., Oct. 16th, 1873, No. 13, Great Waltham Parish.	No.	Privy stench. Drank occasionally of brook close to outlet of village sewer. There has been no case of fever in village.
3.	J. G., Feb. 1874, No. 36, Great Waltham Parish.	No.	Drinking-water from ditch by side of lane. Stench.
4.	W. F. and M. M., No. 38, Danbury Parish.	No.	Pond-water, polluted by their own excrement, is employed for drinking.
5.	C., No. 52, Buttsbury Parish.	No.	Untrapped drains. Well-water polluted by excrement from the cesspool.
6.	M. G., June 1874, No. 56, Great Waltham Village.	No.	Returned from Colchester Hospital five weeks before illness. Water pure. Frequent very foul semi-public closet. Not possible to trace it to Colchester.
7.	C. C. and his family, No. 78, Great Baddow Parish.	No, but possibly contracted in Gt. Baddow village, where cases of fever occur every now and then.	Drink rain-water from roof. In consequence of drought, have recently been drinking the filthiest ditch-water.
8.	H. C. S., Ingatestone Parish.	Returned ill from Norwich, where fever is prevalent.	
9.	G. G. and others, Sept. 1874, No. 89, Great Waltham Parish.	Returned ill from Springfield, where sporadic cases of fever are frequently occurring.	
10.	M. A. C., No. 96, West Hanningfield Village.	Yes.	
11.	W. R. D. S., etc., 111, Stock and West Hanningfield Parishes.	Yes.	
12.	A., August 26th, 1873, Asheldam Parish.	No.	Water polluted by liquid manure of farm-yard, and, after heavy rains, by contents of farmyard privy.
13.	A. F., Dec. 1873, North Fambridge Village.	No.	Water pure. Horrible stinks from privy and ditch.
14.	W. N., May 1874, Heybridge Parish.	No.	Horrible stinks from private privy pervaded house. Drank river-water. Damp and filthy subsoil. No knowledge of any case of fever in neighbourhood, or along banks of river.
15.	A. A., June 1874, Burnham Town.	No fever for some months previously in Burnham.	Three weeks before illness, patient cleansed out a very foul ditch, into which the sewage of Burnham flows and stagnates.
16.	C. O., July 1874, Woodham, Walter Village.	No.	Water exceedingly pure. Very foul privy, without cesspool, four yards from back-door. Small yard saturated with fluid-filth.
17.	J. C., Nov. 1874, Purlough Parish.	No.	Water polluted by excrement.
18.	A. B., Nov. 1874, Burnham Town.	No.	Impure water. Stinking drains.
19.	J. W. L., Jan. 1874, Mountnessing Parish.	No.	Horrible privy stinks at back door.
20.	A. F., March 1874, Mountnessing Village.	No connection could be ascertained to have taken place between this and the last case.	Stench from privy and foul ditch at back door pervaded the house, and spread for some distance, annoying travellers along the turnpike road.

* Read before the Section of Public Medicine at the Annual Meeting of the British Medical Association in Edinburgh, August 1875.

Isolated Cases of Enteric Fever (continued).

No.	Initials and Reference in Visitation Books.	Traceable or not to Pre-existing Case.	Insanitary Conditions observed, etc.
21.	S. G., April 1874, Mountnessing Parish.	No.	Closet $1\frac{1}{2}$ yards from house. Filthy pond-water is drunk.
22.	J. L., March 1874, Wickford Village.	No.	Drinking-water so polluted by farm-yard filth as to be highly offensive.
23.	Worley Barracks, March 1875.	No.	Drain passing underneath room in barracks found blocked up by large quantities of decomposing matter, which had evidently been accumulating there for a length of time, in consequence of the absence of sufficient fall to insure the exit of its contents.
24.	C. M., Little Baddow.	Yes.	Privy and cesspool in house.
25.	E. W., Langford.	No.	Soakage of excremental matters into wall of bedroom occupied by first case creating stench.
26.	J. W., Ramsden, Crays.	No.	Stench from privy about three yards from back-door. Ground at back of cottage saturated with filth. Water-supply liable to pollution from surface-water of road.
27.	W. P., Hazeleigh.	No.	Drinking-water obtained from rivulet which is polluted by leakings from two farmyards after heavy rains. Privy of one of the farms situated directly over the rivulet above the point where it is collected. No case of fever has ever occurred in this small out-of-the-way farm, nor amongst the labourers.

It will be noticed that 3 of the foregoing cases arose in Great Waltham, which is a very large parish containing 7,342 acres, and that 3 happened in Mountnessing, a parish of rather more than 4,000 acres. The dates of the isolated cases in these parishes evidently lead to the view that there was some communication between them, although none was traced: e.g., No. 2, October 1873; No. 3, February 1874; No. 6, June 1874, in Great Waltham; and No. 19, January 1874; No. 20, March 1874; No. 21, April 1874, in Mountnessing Parish. That the poison of typhoid fever may remain in a dormant state, ready to become active as soon as conditions favourable to its development may occur, is very probable, for the poisons of other diseases are well known to remain in an inactive state for varying periods of time. The appearance of two isolated cases at Burnham, separated by an interval of some months, may possibly be in this way satisfactorily accounted for.

Of the 27 isolated cases of enteric fever, 3 were clearly traceable to pre-existing cases of this disease. Excluding, then, all respecting which there was a trace of doubt, namely 16, we find ourselves in the presence of 8 decidedly untraceable cases; namely, Nos. 4, 5, 12, 13, 16, 17, 23, and 25, four of which apparently originated from excremental pollution of water, and the remainder from excremental pollution of air.

No. 12. *Asheldham Outbreak.*—In August 1873, enteric fever appeared in one of a row of ten cottages situated in the parish of Asheldham, contained in the Maldon Union. Seventeen of the cottagers contracted the fever, of whom six died. The cottages are situated in an unfrequented part, about nine or ten miles from the nearest railway station. Every effort which was made to discover any case of fever in the district failed. The rural population seemed exceptionally healthy at that particular time. All of the cottages, with one exception, were overcrowded, the bedrooms being fetid with organic matter. The first person attacked was a young girl, who was in a depressed state of mind in consequence of having recently given birth to an illegitimate child. She was known to be a great water-drinker, and she drank freely of water which, although pure to the senses of taste, smell, and sight, was found to be composed of a mixture of pure spring-water, farmyard liquid manure, and, after heavy rains, of excremental matters from the farmyard privy. An analysis of the water gave one part per million of albuminoid ammonia. From this girl it spread to other members of the family. The neighbours, who assisted in nursing and otherwise helping these stricken cottagers, took the fever, and communicated it to their own families, and thus it was disseminated by contagion, as was, of course, to be expected amongst dirty people living under unwholesome conditions. No trouble was spared in the endeavour to discover a pre-existing case, but without success.

The men who worked at the farm were all healthy, and had been so for some months. No one suffering from, or convalescent from, fever could be found who had visited the farmyard privy. In fact, at that particular time, the district seemed quite free from any case of fever. No suspicion attached to the milk or other food supplied to the family first affected. It is, of course, just possible that some tramp recovering from fever might have communicated to the contents of the privy the specific poison of the disease; but all this is supposition.

No fresh case occurred, although one or two might have been expected, after the cottagers were supplied with good water. The fever, in fact, immediately disappeared, and has not happily returned. The well which has been sunk furnishes water of the finest quality, containing .04 part per million of albuminoid ammonia.

No. 25. *Langford Outbreak.*—G. W., a labouring man, lives with his wife and six children in an isolated cottage which forms the lodge at the entrance of the grounds of a gentleman who occasionally visits his property, called Langford Grove. The cottage is about a mile from the village of Langford, where there has not been a case of enteric fever, to my knowledge, during a period of two years; since, indeed, it has been under my supervision. The wife, who was first attacked with fever, was in the habit of visiting the town of Maldon, about two or three miles distant, for the purpose of marketing, etc., once a fortnight. On May 19th and on June 4th, she went to Maldon, and on June 6th she was taken ill. The medical officer of health of the town states that no case of enteric fever has occurred in Maldon during the past twelve months, except one in a low suburb unconnected altogether with the drainage of the town, which died on March 1st, 1875.

The family lived in a very quiet secluded manner, never going away from home, and never having any visitors or lodgers. The lodge contained only two bedrooms, the larger being about four yards square, the smaller about four yards long and two yards wide. In the larger of the two rooms, the husband and wife and baby slept; the other five children were stowed away in the very small room. On entering the larger bedroom, I observed a most fetid indescribable odour, and noticed that a portion of the wall close to the bed was discoloured and wet. On inquiry, I found that a privy with cesspool existed in the house, and adjoined the bedroom, and that excremental matters had soaked into the thin partition-wall dividing this privy from the bedroom, and had stained the wall at the bedside and made it wet. The occupants sorely complained of the stench arising from this wall, which was saturated with excremental filth. The noxious odour was so great sometimes at night, that the husband was compelled to open the window. They had only lived in the cottage for about six months, and had only recently, since the hot weather had set in, been excessively annoyed by the stinks. The previous occupants of the house had been quite unable to use this bedroom, and accordingly closed it on account of the nuisance.

Two of the children caught the disease of the mother. The husband looked ill and depressed, as if he had been exposed to highly unwholesome influences. The water-supply was pure. There was no suspicion of the introduction of poison by milk or other article of food. On inquiring of the medical man in attendance if these cases were undoubted ones of enteric fever, and how he accounted for the appearance of the disease in such an isolated spot, he writes:—"I have no doubt about the Langford cases being enteric fever. The soaking of the privy filth through the partition-wall into the bedroom accounts, to my mind, for the outbreak. I am quite of the opinion that enteric fever is very frequently developed spontaneously by filth, etc." Every effort to trace the first case to a pre-existing one utterly failed. No one except W. and his family had visited the privy. The family, soon after the recovery of the children, left the cottage. On visiting it about a week or two after their departure, I again entered the offensive bedroom. The odour in it was not that of sewage gas, nor was it an ordinary privy stench, but was of a damp fetid character quite indescribable.

The suggestion of Sir William Jenner that every isolated case of fever in rural districts should be carefully investigated, has led others besides myself to interest themselves in this question. The following cases have been recently recorded by Mr. J. T. Rouse of Lyttleton, New Zealand, and Dr. Domenichetti, medical officer of health of the Louth Combined Sanitary District.

Mr. Rouse writes (*Lancet*, July 10th, 1875):—"Enteric fever appeared in a house situated on the spur of a hill, 250 feet above sea-level, in which no disease of any kind had occurred previously. Only one house was situated higher on the spur, the drainage from which led quite away from it, and the occupants of which had never suffered from fever in any form. As is usual with houses built in such a position, there was a considerable excavation into the hill at the back, round which was a catch-water drain on the surface, running along the back and by the side of the house, intended to carry off storm-water, but which had

been for a long time used as a channel for getting rid of dish-washings and house-slops, and which at the time spoken of had become foul for the want of sufficient fall. On April 12th, 1871, the weather being at the time very hot, Mr. K., the occupant of the house, with some of his children, set to work to clean out and deepen this drain. They suffered considerably from the stench, which permeated the house, and caused nausea to those within as well as to themselves. On the 21st, I was called in to visit one of the younger children, who had unmistakable symptoms of typhoid, and within three days the whole family, including Mrs. K., who had been confined on the 19th, were all, seven in number, down with the same disease, which in each case presented the true signs of typhoid fever. All recovered, and it is worthy of note that at the time there was not another case of typhoid, as far as I was aware, existing in the town, nor did it spread among those who were in attendance upon the family. I cannot but think that this was a case of generation of the disease *de novo* from the putrid sewage disturbed in the alteration of the drain around the house, as I cannot see the possibility of any typhoid excreta having been present."

Dr. Domenichetti writes (*Public Health*, July 8th, 1875):—"A man, aged 57, was seized with marked symptoms of typhoid fever, which terminated fatally in about a week; and upon investigation it appeared that the drinking water was at fault, though not suspected at the time, as it was derived from a 'blow well', which in these districts is a term applied to water derived from the calcareous rock, and forced above the level of the ground by the pressure derived from the elevated sources of it in the 'Wolds', six miles distant. Upon analysis, I found 1.5 grains per gallon of organic matter in it by the potassium permanganate test, and, upon examining the premises, I ascertained that there was a stable-grating within a few yards of the well, which was situated in a court-yard, and I requested the owner to have the drain opened. Upon this being done, the tin pipe through which the water was conducted from the underlying rock was found to be corroded through, and at its base there was an accumulation of refuse from pig-slaughtering, etc., quite sufficient to account for the contamination of the water. I should observe that no other case of typhoid fever had occurred near the spot for some time past."

Some scientific men argue that the origin *de novo* of a fever-poison is as impossible as the spontaneous generation of animals and plants, and that enteric fever has existed from the commencement of time. Confining ourselves to the remembrance that certain diseases die out, and are superseded by others, let us reflect on the subject as practical medical men, avoiding for the present all speculation.

We all very well know that, although enteric fever is communicable, it is rarely communicated to the medical attendant, to the nurse, or to the inhabitants of the house, provided that the house be capacious, so that the poison is diluted, cleanliness be observed, disinfectants be used, the evacuations be immediately buried, and other measures be adopted, all having for their object the prevention of air-pollution by the poison, or the dilution or destruction of the poison, if the air be polluted therewith, and the prevention of the exposure of food to its influence. We know also that, when it occurs in dirty cottages, the majority of which are, for all practical purposes, overcrowded, and redolent of organic matter, where ignorance prompts the occupants, who generally look upon the visitation in a fatalistic manner, to depreciate the value of all preventive measures, this fever often does spread.

The experience of the London Fever Hospital shows that an abundance of fresh air and cleanliness are most successful in preventing the spread of the disease, and that stools of typhoid patients, although extremely prone to decomposition or fermentation, are comparatively harmless in a fresh state.

Given the same circumstances amongst an unvaccinated community, and small-pox will probably spread in the clean and well appointed house as well as in the dirty overcrowded cottage, although not to the same extent in the former. This result, of course, arises from the fact that small-pox is a more contagious disease. Sir William Jenner writes:—"It is evident that the more contagious a disease—i.e., the less the quantity of the poison needed, the shorter the time of exposure necessary, and the less preparation required in the system of the individuals receiving the poison—the less frequently *à priori* should we expect that the disease could be traced back to its primary source. While amongst diseases of the opposite class (such as enteric fever) which are the least contagious, and require for their spread a longer exposure or more decided dose of the poison, or the administration of the poison in a particular way by a special channel, the more frequently should we expect (if every new case were due to exposure to the emanations from the sick of the same disease) to be able to trace them to their original source, and the more easily should the parent case be discoverable. But, in fact, it is not so; for those which are the most contagious are the most commonly traceable to their origin, and those which are the

least contagious can the less frequently be proved to have origin in contagion."

If cases of enteric fever, occurring singly in isolated country places far distant from one another, always arose from some communication with a pre-existing case, there should never, it may very reasonably be inferred, be the slightest difficulty in tracing out the source. But, as a matter of fact, it is often quite impossible to establish any connection whatsoever between these solitary cases and any outside case. To believe that this fever never arises *de novo*, it is necessary also to believe in occasional invasions by infected tramps, who, not being seen by the dwellers of these out-of-the-way places, must be deemed to be ghostly visitors! What circumstances do we find common to all those isolated cases of enteric fever that are not traceable to pre-existing cases? Either horrible stench arising from decomposing excremental matters, or drinking water poisoned with decomposing filth; either air-pollution or water-pollution invariably obtrudes itself on the notice of the medical man who endeavours to ascertain the cause. In reply to the question, "Where did the patient catch the fever?" the response frequently is, "Nowhere; he (or she) bred it, sir." There would seem a very deep-rooted belief amongst the rural poor and amongst country doctors that this fever is often what is termed "bred"; in other words, "not caught" but "generated". Those who do not believe in the spontaneous origin of this fever inquire: "How is it that people drink water polluted by excrementitious filth and organic putrefactive matters for years, and are never affected with fever, although they may have suffered from diarrhoea and other ailments evidently dependent thereon until the arrival of a person suffering from fever amongst them!" This argument is the strongest in the armoury of the anti-independent origin advocates; and, although it has been answered in a certain way, it has not been met, in my opinion, quite satisfactorily. It is urged that "excremental pollution is one of several factors (such as a certain temperature, amount of ozone, or other atmospheric conditions) necessary for the production of the enteric poison; and, in the absence of the other factors, it may be inert, and that a person newly arrived is the first to suffer, in virtue of a well known law: that a change of residence predisposes to an attack of the disease". (Murchison's *Treatise on Fevers*.)

Cases have occurred in my experience where diarrhoea has attacked one or two members of a family, whilst a third suffered more seriously, exhibiting the distinctive symptoms of typhoid fever, both affections apparently producible by pollution of the air or of the water with excremental filth. A case of this kind mentioned at the meeting of the Epidemiological Society in April 1874 deserves to be recorded. Dr. Carpenter of Croydon was in charge of a school containing nearly two hundred children. Fifty-four of them were attacked with diarrhoea in the course of three days, when no diarrhoea or fever existed in the neighbourhood. Suspicion at once fell on the well, into which sewage proceeding from the boys' urinals and washing-places was found to be trickling. The source of supply having been changed, no fresh cases occurred, and all the children were well in two days, except three. These three cases ran through a mild form of typhoid of twenty-one days' duration, and exhibited distinctly marked rose-coloured spots. Dr. Carpenter states positively that no one recovering from or falling ill of typhoid fever could possibly have used these urinals, etc., for more than three months (probably much longer) previous to the outbreak.

There can be no doubt but that the existence of a certain condition of receptivity is necessary in an individual, and that this state is manifested in some persons at particular periods of a life and times of a year, and is never developed at all in others. It would seem also as if, during sleep (probably at daybreak, when the vital powers and the normal resistance of the body to the attack are at their lowest), there is a greater susceptibility to be affected by the poison than during the waking hours. It is, of course, illogical to argue that, because a disease can be proved to be often communicated by the sick to the healthy, it can never arise in any other way. The poisons that give origin to the diseases known as dysentery, puerperal fever, erysipelas, and pyæmia are believed by the profession to be produced *de novo*. Many, such as Maclean and others, who have had some of the best opportunities of studying dysentery in different parts of the world maintain that the dysenteric stool is as contagious as the typhoid stool, and that the dysenteric poison is produced by the putrefaction of animal substances under certain conditions. Puerperal fever, which often arises from accidental conditions, becomes sometimes actively contagious.

I refrain, for obvious reasons, from touching, however briefly, on the researches of Chauveau, Burdon Sanderson, Beale, Bastian, and Klein on contagion, in relation to elementary forms of life, which are also directed to the solution of the great mysteries of the origins of healthy and diseased life, for they cannot be dwelt on in a few words relative to the ques-

tion before us. Nor can the views of Professor Hallier of Jena as to the identity of the micrococci of the fungus named *Penicillium crustaceum* with the poison of the disease be considered. All discussion of the interesting questions as to the relation of the rise and fall of the ground-water to enteric fever, as to the omnipresence of typhoid germs in the air ready to develop as soon as they meet with a congenial soil and suitable conditions for multiplication, as to the probability or otherwise of the dissemination of the disease by other articles of food besides milk, and as to whether high feeding or the consumption of the meat of fevered or otherwise diseased cattle or sheep, or meat in a putrefactive state, have any etiological connection, must be reluctantly avoided. I have limited the question, for want of time, to the narrowest point; namely, that in which it presents itself in rural districts to the health-officer who is stationed far away from railways, those disseminators of disease which are so indispensable to our comfort.

It has always been my opinion, which is continually receiving confirmation, that all air polluted by stinks, and water contaminated with an excess of organic matter, are deleterious to the health of those long exposed to their influence, although infinitesimally so perhaps in many cases where the powers of vital resistance are great, and that the filth-contamination of air or water may or may not be associated (we never know when) with a disease-ferment, *alias* filth-ferment, *alias* septic ferment. Experience has taught me that enteric fever often occurs in isolated out-of-the-way places, where it is quite impossible to trace a pre-existing case, and where the only sanitary evil detectable is pollution of water or air by the products of faecal decomposition or fermentation.

I do not express the opinion that the poison of typhoid fever is capable of spontaneous development, for we do not at present possess sufficient evidence to come to any decision on the matter. Although, if my mind be prejudiced at all in the matter, it is prejudiced in favour of the more philosophic view that enteric fever never arises spontaneously, yet my judgment points to the opposite conclusion. Just as the poison producing ague is generated in, and emitted by, earth laden with decomposing organic matters under certain states of climate and soil, so the poison of this fever may arise from some unknown changes in the excremental matters of flesh-eating animals under certain atmospheric conditions, and spread by contagion.

The consideration of this subject at this meeting of the British Medical Association appears particularly *à propos*, because the Edinburgh School is, I believe, considered to offer the principal opposition to the opinion that enteric fever is traceable to the pollution of air or water with the products of excremental decomposition, independent of the introduction of the specific poison from without.

REMARKS ON ENTERIC FEVER.

By JOHN RICHARD WARDELL, M.D., F.R.C.P.,

Senior Physician to the Tunbridge Wells Infirmary.

NONE of the various types of continued fever are characterised by greater irregularity and anomalies, both in the mode of accession and during the progress, than the enteric; and this discordance of the phenomena, more especially at the outset of the attack, should be held in due consideration, because the disagreements and semblances which it assumes may be followed by error in diagnosis, and consequently by wrongly directed or absolutely mischievous treatment. Again, the etiology is frequently surrounded by such conflicting facts, and with so much irreconcilable evidence, as in no slight degree to add to the dubiousness and difficulty which even those of the greatest experience often entertain at the commencement of the affection. Sometimes five or six, or even six or eight, days may pass before the physician can confidently pronounce on the real nature of the malady. A correct opinion sometimes cannot be given until the advent of the characteristic spots. Such being the case, it is obvious that, during the initiatory stages, much caution should be observed by the practitioner before he commits himself to a definite declaration. He may be asked whether it be or be not specific fever in the first days of the complaint, when no decided reply can consistently be made; and, if a rash and venturesome answer be returned, there is the chance of being wrong, and thus, it may be, of leading to misunderstanding on the part of the patient's friends, and to the loss of professional confidence. The public are little prone to make allowances for those mistakes and misadventures which must of necessity from time to time occur in a science so inexact, where, in examination, underlie so many sources of fallacy, and where there is so much room for individual theory and speculative deduction, as in the science and practice of medicine; and hence it is not well, in febrile diseases generally, to give statements which cannot

be borne out by obvious reasoning and the unassailable testimony of ocular demonstration. The first symptoms of enteric fever may closely look like one thing, and soon they may simulate another. We are sometimes called to see cases which appear to be nothing more than a mere biliary attack; purgatives may be given, under the hope of a speedy convalescence; and, instead of improvement, the general disturbance in the system becomes more proclaimed; the looseness of the bowels turns to a severe or an uncontrollable diarrhoea; the pulse becomes quick; there are headache, restlessness, and insomnia; the abdomen is rendered tense and resonant; and the temperature may be three or four or more degrees above normal. The idea of the disease being a mere biliary attack begins to be rendered very doubtful, and fears of a graver affection are entertained. The aperients or purgatives to carry off the bile may unfortunately institute intestinal irritation, and this kind of mischief may occur when the patient is in the best of hands. The converse is sometimes presented, when we dread the accession of specific fever, and the disorder proves to be of transient character. Not long ago, I was requested to see a lady between thirty and forty years of age, who for some short time previously had not been in good health. It was reported that she had sat in damp shoes, and had taken cold, and had had rigors. When I saw her, she was labouring under diarrhoea and sickness; she looked flushed and feverish; complained of headache and aching in the limbs; the tongue was coated with a white moist fur; the pulse was 120, and the temperature in the morning 102 deg. It was also ascertained that she had taken some indigestible food; but, on a general review of all the particulars relative to the case, there arose in my mind a great suspicion of fever. She was ordered the usual remedies for the sickness and diarrhoea, and strict attention was given to the kind of nourishment allowed; and in a couple of days the pulse fell to 76, the temperature a degree below the natural standard, and she expressed herself as being almost well. In some exceptional instances, a person may have enteric fever—in short, gastric or intestinal irritation from the beginning to the end of the disease; he may, perhaps, have only complained of shivering and headache, of the loss of appetite and disturbed sleep; he may not have been confined to his bed or room, and even may have pursued his occupation with little interruption. Or there may be for two or three weeks a comparatively trifling indisposition, accompanied with moderate looseness of the bowels, and the affection may run its course without its specific qualities being recognised. I have known it regarded as erysipelas, when the erysipelatous inflammation was merely the incidental accompaniment of the foregoing and primary disease. According to the experience of Louis, Chomel, and Forget, erysipelas is the association in about one case in twenty. It may be in one or other of the limbs, or in the head and face. I have known a contusion on the head, received during the accession of the primary fever, to become the exciting cause of this complication in very severe degrees, when the superadded erysipelatous symptoms have very greatly masked the primary and underlying complaint.

I have known enteric fever to put on a very close resemblance to delirium tremens; and sometimes, when the patient has been of intemperate habits, there may at some part of its course be the greatest difficulty in deciding as to which of the two affections has to be treated. There will be the same kind of rambling incoherence, the restlessness, the wakefulness, and the frequent attempts to get out of bed, which are the common symptoms of acute alcoholism; or mere mania may be simulated. Not very long ago, I saw with Dr. Ievers of Tunbridge an illustrative example of what is now stated. A young woman, a domestic servant, was taken ill at Hastings, and, in the course of a few days after the commencement of her indisposition, she was sent home in a fly, a distance of nearly thirty miles. Immediately after her arrival, she became quite maniacal; she talked incessantly, in that garrulous and unconnected manner which is characteristic of insanity. For several days, there was no change in this peculiar and prominent symptom; and, as there were no other very marked features in her case, it had become a question—and a very reasonable question—on the part of her friends, if the asylum were not the most proper place for her reception. There was one symptom, however, amongst much conflicting evidence, which in itself was a significant fact: the temperature was three degrees above normal. This gave a very strong probability of enteric fever. The case soon proved itself to be that disease, and the patient made a full recovery. In uræmia, and when the blood-poisoning consequent on renal disease has for a time gone on, typhoid conditions are often assumed which render the case most perplexing. To say whether we have an example of uræmia with typhoid symptoms, or uræmia as a complication in the course of an enteric attack, is not unfrequently most difficult. In some instances, the thermometer can alone solve the question. Upon the single fact of the degree of temperature we may have to make the decision.