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.

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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.

Every practitioner is aware of the resemblance between phenomena of typhus and typhoid pneumonia; and that pleurisy, laryngitis, and diphtheritic forms of inflammation, are sometimes associated with the disease now considered. Intermittents and remittents may at the first appear to be present, and the morbid phenomena pass on into enteric fever. A mere dysenteric affection may be likened, and a week pass before continued fever is recognised; or a choleraic kind of condition may at the first be presented, more especially during the summer and autumn months, when gastric and intestinal complaints are apt to prevail. Again, acute rheumatism is sometimes so simulated as to render the correcter diagnosis impossible. The following instances may here aptly be cited.

CASE I.—Mary T., aged 16, a maid-servant out of place, was attended as an out-patient by the then house-surgeon, Mr. Benjamin Rix. At the beginning of her illness, she showed the ordinary symptoms of rheumatic fever. She had in a marked manner muscular and arthritic pains; she could not turn in bed, and screamed with pain. The elbows, wrists, knees, and ankles became swollen; and there was some præcordial uneasiness, with a systolic *bruit*. Quick pulse, exalted temperature, and powerful diaphoresis, added their testimony to the rheumatic notion of her case. She was—and, as it was thought, very properly—taken into the Infirmary, and placed in a general ward. Immediately after her admission, the articular swellings began to decline, the case proclaimed itself beyond all doubt enteric fever, and she died nine days after coming into the institution.

CASE II.—George B., a powerful man, twenty-eight years of age, a labourer, was taken ill in November 1874, and was attended as an out-patient by the house-surgeon, Mr. Cleland Lammiman. When first seen, he had all the symptoms of acute rheumatism. He then complained of great muscular and arthritic pains, and all the large joints were red and swollen; he had powerful sweats, with high and scanty urine of acid reaction; and his illness was very naturally considered to be rheumatic fever. On the 17th of that month, he was taken into the hospital, and placed amongst the other patients. In the course of a couple of days, the definite characteristics of enteric fever were presented; the pulse, temperature, spots, tympanites, decubitus, delirium, and other distinguishing symptoms, dissipating any doubt as to the nature of the ailment. The disease ran a marked and severe course, and for some days his recovery seemed exceedingly doubtful. He was discharged from the Infirmary after having been an inmate nine weeks.

CASE III.—A married lady, fifty-eight years of age, had more or less been under my care during the whole of the year 1874. She had loss of power in the right arm, and there was some feebleness in both her legs. She had been for some time before I saw her in declining health. She was pale and anæmic, had lost flesh, and the digestive organs were apt to be disordered. She had taken ferruginous, phosphoric, and other tonics, with cod-liver oil; had been ordered a carefully selected diet; and electro-galvanism had been applied to the arm. Under this treatment, there was marked improvement. In the latter part of January 1875, she took an hour's drive in an open carriage. After this, she felt stiff in her limbs, as if she had taken cold. She had pains in the back and arms and legs, felt feverish, and had some degree of headache. She kept her bed for two or three days, under the hope that she would be better of her cold. I first saw her on February 3rd. The pulse was then quick, the temperature above normal, and all the large joints were painful and slightly swollen. After two days, the elbows, wrists, hands, knees, and ankles, were red and more swelled. She had drenching acid sweats, and the urine was of acid reaction; the tongue was coated, and the bowels were confined. The muscular pains were so extreme, that she could not turn, and hardly move, in bed. Slight jaundice supervened, and the swelling in the joints rapidly subsided. Though I had not hesitated to tell her friends the illness was rheumatic fever, which at first I fully believed it to be, before the end of the week from my being called in, I had to very importantly modify such opinion, and declare the presence of a grave attack of enteric fever, and to which I added a foreboding prognosis. Her age, her previous ill-health, and the severity of the symptoms, warranted such way of speaking. She died on the seventeenth day of the month, or at about the end of the third week of the disease. There were all the cardinal characteristics of specific fever, notwithstanding that this complaint had been at the outset perplexingly mixed up with those phenomena which are regarded as the essential qualities, objective and subjective, of acute rheumatism.

Not long ago, in conversation with Sir William Jenner, I recounted particulars of these exceptional cases. He told me, that latterly he had seen two examples precisely similar, in which, during the commencement of the affection, the name of acute rheumatism could only be given to the complaint, but which went on into veritable enteric fever. Murchison, in the last edition of his work on *Continued Fevers*,

says: "In several instances, I have known the pains in the limbs to assume a neuralgic character and prevent sleep, while in others they are articular, and the case at first simulates rheumatism." Now, in acute rheumatism, rapid subsidence of articular swelling is often succeeded by cardiac implications, a circumstance which did not occur in the foregoing examples; and, when acute rheumatism runs its common course, enlargement of the joints may, and mostly does, continue for weeks when the joints are swelled. Garrod says that, in such cases, a large percentage have inflammation of the endocardium or pericardium. It is true that in some cases of acute rheumatism typhoid symptoms may be presented; but there are negative facts which distinguish such instances from the specific disease, and it must be held in remembrance that in fatal examples of rheumatic fever, death eventuates, not merely from the serous covering within or without the heart being inflamed, but from the absolute pathologic changes which have taken place in the walls of the organ, whereby its contractile and expansive functions become affected; or it eventuates from cerebral disease, which often is dependent as much upon failure of heart-power as upon alteration in the circulating fluid. When the brain-lesion is the proximate cause of a fatal issue in acute rheumatism, and when typhoid appearances are recognised, certain negative facts come to our aid in drawing the distinction between such condition and the specific disease. There may be no diarrhoea, but a tendency to constipation; no pain, or pressure, or gurgling in the right iliac fossa; no tympanites; no eruption; and the clinical history may differ from the clinical history of continued fever. The patient's previous habits, the climatic and other influences to which he has been exposed, the kind of illnesses through which he may have passed, and certain constitutional tendencies, will often markedly modify the disease in its progress, and, it may be, importantly determine the kind of complication with which we have to deal.

I have before incidentally remarked, that fever of the periodic type may at the outset seem to be present, and the symptoms then assume the enteric form. Nearly three years ago, I was requested to see with Mr. Marsack, an illustrative instance of that which is now maintained. A gentleman of powerful frame, in robust health, and fifty-nine years of age, visited Rome in the early spring of 1873. After a sojourn of three or four weeks he contracted the endemic, and as soon as he was able, returned home. He then gradually improved, and, for a short space of time, he appeared to have become free of the complaint. In the latter part of April he threw off his upper coat and took cold. The rigors, headache, quick pulse, heat of skin, and the usual febrile phenomena were again apparent. The drenching sweats at regular intervals, and the clinical history, very naturally made his medical attendants pronounce the affection to be a return of the Roman fever. Sir William Jenner, who saw the case with Mr. Marsack and myself, at his first visit, thus regarded the ailment. In a short time the complaint gave abundant and unequivocal evidence of enteric fever. The case ran a protracted and severe course, and with its progress the sweatings ceased; and it was then only characterised by those broad and distinguishing phenomena which mark so significantly this type of continued fever. The diarrhoea, the distressing tympanites, the grave amount of pneumonia, and protracted delirium, for long rendered the issue most doubtful, and more especially when the patient's age was taken into account, and it was evidently only through a fine organism and previously unimpaired health that the case did not pass on to a fatal termination. The disease seemed insensibly to change from the periodic to the enteric type. Sir William Jenner had seen the same kind of example before.

CASE IV.—On July 3rd, 1874, a young gentleman, twenty years of age, consulted me for cough, loss of flesh and strength, and a general condition of ill-health. A London physician had sent him to Tunbridge Wells for change of air. He was thin, pale, and anæmic, and evidently of exceedingly nervous and excitable temperament. On examination, it was clear that he was labouring under pulmonary phthisis in the first stage. About midnight on the 13th of the same month, I was hastily summoned to his bedside. He had gone to sleep but awoke suddenly, and immediately coughed up blood, and he lost a considerable quantity before this attack of hæmoptysis subsided. In the course of two or three days, the breathing became exceedingly accelerated. On the 20th, I had no hesitation in pronouncing the illness that of enteric fever. The case soon assumed the gravest symptoms. Diarrhoea, tympanites, subsultus, extreme prostration, dry tongue, and delirium, were the objective indications of its being an attack of much virulence. The pulse ranged between 120 and 130, and the respirations were so quick that the breathing became panting. During the first eight days of August, the third week of the fever, the pulse varied between 116 and 132, the temperature from 100.2 to 104 and 106, the respirations were never during this time less than 48

in the minute; and, on August 3rd, the day on which the temperature was 104, the pulse was 132, and the respirations so high as 68 in the minute. The temperature within a few hours of his death, which occurred on August 9th, fell to 100.4, but the pulse kept up to 132, and the respirations at 50 per minute. For many days the jactitation was incessant and in extreme degree, nor do I remember having ever witnessed greater jerking movement in the limbs than in this patient. Louis, Jenner, and Murchison regard muscular tremors and agitation as being frequently of fatal import. The excessive respiration above recorded had doubtless much reference to the tubercular obstruction which already obtained in the upper third of the left lung, just as we notice quickened breathing in intercurrent pneumonia; the pulmonary substance becomes engorged, and the heart is stimulated to increased exertions. In this young gentleman, however, there is no doubt that an overdose of the specific poison was also a cause of this abnormal respiration, as it was evident that the great nerve-centres were from the first in marked manner affected. According to Forget, phthisical subjects very rarely contract enteric fever; indeed, this authority regards phthisis as protective from enteric infection. Louis saw four fatal cases of enteric fever, in which tubercles were discovered in the lungs.

In the last cited case, the hæmoptysis was a very unfortunate event, and more especially in a person who was already debilitated by disease. It was presumptive that the malady would, after the large amount of blood which he lost, assume the state of prostration. I may here for a moment compare these three particulars, namely, the pulse, respiration, and temperature, with the notes of another case of this complaint which were taken daily throughout the disease, and where it ran a moderately severe course.

On February 22nd, 1874, I was requested to see a single lady, aged 35, in the country, who had just returned from the north of England. It was reported that, ten days previously to her becoming ill (dating that illness from the first accession of rigors and headache), she had entered a cab, that the smell in the vehicle had almost made her sick, and she fancied she had never been quite well from that moment. On my first visit, I gave the opinion that the complaint was the beginning of enteric fever. The pulse was 120, respirations 22, temperature 101.2. Diarrhœa, tympanites, prostration, and the eruption, soon proclaimed the nature of the malady. The right lung in its lower half or more was affected with a low form of congestive pneumonia, which, however, became amenable to the ordinary remedies. During the subsequent twenty-eight days the pulse never exceeded 122; the respirations were only once so high as 30, which was, at the end of the second week, at the time when the pulmonary complication was most pronounced, and the temperature attained its maximum degree at the same time when it reached 103.4. During the first week, the highest pulse was 122, the highest respiration 26, and the highest temperature 102.2. During the second week, the highest pulse was 116, the highest respiration 30, and the highest temperature 103.3. During the third week, the highest pulse was 108, the highest respiration 24, and the highest temperature 103.3. And, during the fourth week, the highest pulse was 100, the highest respiration 24, and the highest temperature 100.2. Now in Case 4, less of breathing space in the left lung was encroached upon than in this lady, whose right lung was obstructed over from one-half to two-thirds of its course; hence, the very excessive breathing in the young gentleman was doubtless mainly referrible to the virulent qualities of the specific poison in an organism which seemed resistless against its effects. It may be regarded as a rule in this form of fever, that in all instances in which the respirations exceed forty in the minute, that there is acute—and it may be, as now proved exceptionally, chronic—lung-disease. The respiratory movements increase relatively with the advance of the fever, or, in other words, in proportion to the amount of general prostration. When the breathing is of the panting description, so far as my own experience goes, there are generally grave doubts as to the result, such examples frequently going on to a fatal termination. Again, in the instance now considered, illustration was forcibly given of the extreme severity of the case by the sudden rise and fall of the pulse, the disturbance in the pulse-respiration ratio, and the extreme subsultus and jactitation. These conditions alone ominously pointed to a fatal ending.

CASE V.—I was sent for early in the morning of March 11th, 1875, to see a gentleman, forty years of age, who was reported to be labouring under a severe biliary attack. When I reached the house, he was dressed and walking about the room. He told me he had diarrhœa and felt exceedingly sick, and he had just vomited some greenish-yellow glairy mucus. I was informed that he had come from the Isle of Wight on the first day of the month, and that he had never seemed well since his return home. He had gone out every day during the previous ten days before I saw him, but he had felt chilly, complained

of weakness, headache, loss of appetite, and inability to sleep. At my first visit, the pulse was 120, the skin harsh and dry, the tongue was coated in the centre and red at the tip and edges. I was particularly struck with the facial aspect, as he looked pale and sunken in the face. I requested him to go at once to bed. I told his wife I feared her husband was in a serious illness. I then thought the case enteric fever. He was ordered a mixture, with small doses of potash and hydrocyanic acid to be taken in effervescence, with a few grains of citric acid, and requested to have some iced brandy-and-water, and, as soon as his stomach could retain anything, to have at short intervals strong cold beef-tea. In the evening, the sickness had in a great measure subsided, but he looked hot and flushed. The tongue was dry, and the countenance had a markedly febrile expression. The pulse was 120, respirations 26, and temperature 104. On the following morning he said he was no better. I found he had had a very restless night, and had wandered. The face was flushed, and the eyes looked glassy and wild. The skin was hot and moist, and he had perspired a good deal. On the first examination of the thorax, there was some dullness at the upper and posterior part of the right lung, and this increased. The abdomen was tympanitic, and two rose-coloured spots were detected. He did not complain of pain or pressure at the right iliac fossa, nor was there any gurgling. The bowels were loose, and the excretions dark and biliary. Pulse 128, respirations 28, and temperature 104. He was ordered an astringent mixture, a large poultice to the back of the chest, port wine, brandy, strong beef-tea, and calf's-foot jelly. In the evening there was no improvement. On the 13th (morning), the symptoms were much the same; pulse 120, respirations 26, temperature 102. In the evening, the temperature was higher still by two degrees. On the 14th, he was much worse. Sir William Jenner saw him with me at eleven o'clock in the evening of that day; he then lay in a semi-unconscious state, bathed in perspiration, the pulse being 128, small and compressible, the respirations 28, and temperature 104. He gradually sank, and died three hours after our consultation.

There were certain points of interest in this case which exemplify what has already been said relative to the peculiarities of enteric fever. Its accession was, by the patient and his friends, considered as merely a biliary disorder. He was taking his walks and going about in the town and neighbourhood only five days before he deemed it requisite to have medical advice, and, too, before his death! His downward progress after I saw him was remarkably rapid; and, as Sir William Jenner observed, the illness was characterised by a degree of virulence which rendered all remedies quite inoperative. In this instance it was precisely that which we have sometimes to witness in scarlet fever and diphtheria, when the symptoms assume a malignancy and violence of character, and the system succumbs in despite of every effort and every agent. Another fact worthy of note is, that as an incidental circumstance it would seem developed in his system. A few days before the accession of the first symptoms, he slept in a room in which there was an escape of gas. He said he "awoke in the morning almost poisoned with the gas, and had never been well afterwards". It was also subsequently stated, that the house in the Isle of Wight where he had resided, was a new excellently drained house, and the water used was regarded as exceedingly pure. In this instance, the poisonous effect of the gas was a main factor in the development of the specific symptoms. There were no cases of typhoid anywhere in the neighbourhood of the house which he had left, nor, it was believed, in that part of the Isle of Wight whither he had for a few days gone to sojourn. After much inquiry, the etiological conclusions were not a little favourable to the doctrine of autogenesis. In the third case, before given, this view of the primary cause seemed to receive, after much deliberation, considerable confirmation towards such way of thinking. This lady lived in a recently built house, in grounds which quite separated it from other residences. Her husband, who superintended its building, had paid utter attention to the drainage and other sanitary arrangements. The closets were constructed on the Nightingalian principle, now adopted in all newly constructed hospitals, whereby the closets are entered by a small lobby with windows opposite, thus ensuring through ventilation; and when I accompanied him over the house, all the traps and drains seemed in perfect order. On account of this lady's indisposition, they had for long received no visitors, and for months had remained at home. It was consistent with my knowledge that there was not another case of typhoid in the district. The water which the family drink and use for all culinary purposes is from a well eighty feet deep, and quite remote from the house or any other building, and where its contamination is simply impossible. She took a drive in an open carriage, caught a chill, and this seemed the only cause and forerunner of the fever.

[To be continued.]