Observations

ON

TYPHOID OR INTESTINAL FEVER: THE PYTHOGENIC THEORY.

BY

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"So the ordinary face and view of experience is many times satisfied by several theories and philosophies; whereas, to find the real truth, requireth another manner of severity and attention." (*Advancement of Learning.*)

PART I. (*Concluded.*)

Pythogenic Theory Irreconcilable with the Prolonged Absence of Typhoid Fever in Villages where Pythogenic Compounds are rife; also, with the Low State of Fever-Sickness and Mortality in the Population exposed to the Foul Sewage Emanations of the Thames in 1858-59. The Phenomena really those of a Contagious Fever disseminated (chiefly) by Liquid Discharges.

THE two following extracts from Mr. Simon's recent *Report on the Public Health in England* in 1860, will show how true to fact these statements were.

In an account of an epidemic which ravaged the village of Kingston Deverill in 1859-60, and which affected a sixth part of the whole population, Mr. Simon offers the following as the sufficient explanation of such wide spread infection:—"Probably an essential evil was that no precautions were taken in dealing with the evacuations of the sick; that these dangerous morbid products were extensively cast on to the common dust (dung ?) heaps (as doubtless, also, into the common privies of houses wherein fever cases had arisen. (*Third Report of the Medical Officer of the Privy Council, p. 11.*)

In reference to the circumstances of another fever stricken village, Dronfield, in Derbyshire, he says:—"Among details reported by the inspector was one which, notwithstanding its disgustingness, deserves particular notice; he was informed that, recently, below one house where typhoid fever was present, a long track of blood, descending the hill-side, marked the tract where the diarrhoeal excrements had been thrown, and let run past two rows of houses *into the turnpike road.*" (*P. 12.*)

Not only in these, but in other particulars, it would be difficult to find more striking illustrations of the leading positions taken in this series of papers, than in the history given by Mr. Simon of these two outbreaks. That of Kingston Deverill is especially worth studying in this point of view.

The very large proportion of inhabitants who suffered is another instance, in addition to those already named in this communication, of the incomparably greater havoc committed by the disease in village communities. The fact that the outbreak was the result of a direct importation showed that the organic impurities, dungheaps, open cesspools, etc., which abounded in the village, only caused fever on so terrible a scale when they became, in the course of events, impregnated with the fever virus.*

* With reference to the local beginnings of the fever, Mr. Simon

The need of some radical modification in the view commonly taken of the relation which subsists between typhoid fever and sewage was placed in a very striking light by the state of the public health in London, during the hot months of 1858 and 1859, when the Thames stank so loudly.

Dr. McWilliam has already pointed out, in fitting and emphatic terms, the utter inconsistency of the facts with the received notions on the subject. Never before had nature laid down the data for the solution of a problem of this kind in terms so large, or wrought them out to so decisive an issue. As the lesson then taught us seems to be already well nigh forgotten, I may, perhaps, be allowed to recal for a moment or two some of its more salient points.

The occasion, indeed, as already hinted, was no common one. An extreme case, a gigantic scale in the phenomena, and perfect accuracy in the registration of the results—three of the best of all the guarantees against fallacy—were all combined to make the induction sure. For the first time in the history of man, the sewage of nearly two millions of people had been brought to seethe and ferment under a burning sun, in one vast open cloaca lying in their midst.

The result we all know. Stench so foul, we may well believe, had never before ascended to pollute this lower air. Never before, at least, had a stink risen to the height of an historic event. Even ancient fable failed to furnish figures adequate to convey a conception of its thrice Augean foulness. For many weeks, the atmosphere of Parliamentary Committee-rooms was only rendered barely tolerable by the suspension before every window of blinds saturated with chloride of lime, and by the lavish use of this and other disinfectants. More than once, in spite of similar precautions, the law-courts were suddenly broken up by an insupportable invasion of the noxious vapour. The river steamers lost their accustomed traffic, and travellers, pressed for time, often made a circuit of many miles rather than cross one of the city bridges.†

For months together, the topic almost monopolised the public prints. Day after day, week after week, the *Times* teemed with letters, filled with complaint, prophetic of calamity, or suggesting remedies. Here and there a more than commonly passionate appeal showed how intensely the evil was felt by those who were condemned to dwell on the Stygian banks. At

says, Dr. Whitley collected evidence to the following effect:—"That on September 1st (1859), the first patient came under medical treatment; a man of the poorest class, an habitual tramp, who, for some time before his attack, had been absent from home, and must, it seemed, have contracted the disease on his travels; that the second case was in the person of this man's mother, who had come from her home on the other side of the village to stay with and nurse him during his illness, and herself required medical treatment on September 23rd; that the next patients (September 25th and 30th) were two women (one of them living next door, west, to the first infected cottage, the other living in another group of cottages), who had both of them frequented the first infected cottage, and had given help in nursing there; that the fifth attacked (October 9th), was a child of other next door neighbours (east) of the first patient; that the disease eventually spread to more than twenty cottages, scattered singly, or in little groups, about the large area of the village; that in some cases, several inmates of one cottage were attacked—father and mother, and even three or four or five children; that the infection of the disease was, in at least one instance, conveyed to a neighbouring village. It need not be said that the sufferings of the people were very great. A sixth part of them contracted the disease." (*Ibid.*, p. 10.)

Truly, a touching as well as most instructive history. And all this, not through foul smells, which, no doubt, were as bad before the fever as during its course, but simply through direct importation of the fever by a poor tramp.

† Several instances of this came to my own knowledge.

home and abroad, the state of the chief river was felt to be a national reproach. "India is in revolt, and the Thames stinks," were the two great facts coupled together by a distinguished foreign writer to mark the climax of a national humiliation. But more significant than all this of the magnitude of the nuisance was the fact that five millions of money were cheerfully voted by a heavily taxed community to provide the means for its abatement. With the popular views as to the connection between epidemic disease and putrescent gases, this state of things naturally gave rise to the worst forebodings.

Members of Parliament and noble lords, dabbblers in sanitary science, vied with professional sanitarians in predicting pestilence. If London should happily be spared the cholera, decimation by fever was, at least, a certainty. The occurrence of a case of malignant cholera in the person of a Thames waterman early in the summer, was more than once cited to give point to these warnings, and as foreshadowing what was to come. Meanwhile, the hot weather passed away; the returns of sickness and mortality were made up, and, strange to relate, the result showed, not only a death-rate below the average, but, as the leading peculiarity of the season, a remarkable diminution in the prevalence of fever, diarrhoea, and the other forms of disease commonly ascribed to putrid emanations.

After describing in scientific and forcible terms the unprecedented state of the river, Dr. Letheby adds:—"With all this condition of the Thames, however, the health of the metropolis has been remarkably good. In the corresponding period of last year (*i. e.*, of the year 1857), the cases of fever, diarrhoea, and dysentery, attended in the city by the medical officers of the unions, amounted to 293 of the former and 181 of the latter; but during the past quarter (*i. e.*, the quarter of intolerable stench), they were only 202 of the former, and 93 of the latter!"

So that, while pythogenic compounds were poisoning the air with a forty thousand fever-power, pythogenic fever, so far from rising in proportion, fell vastly below its average.

The testimony of Dr. McWilliam, as medical supervisor of the waterguard and waterside custom-house officers, is still more to the point. The former, to the number of more than 800, "may be said to *live on the river, or in the docks, in ships, or in open boats*; and the latter numbering upwards of 500, are employed during the day *in the docks, or at the various wharves of the bonded warehouses on each side of the river*." After stating that the amount of general sickness among these men was below the average of the three preceding years, and considerably below that of the year 1857, he adds, "that as regards the types of those forms of disease (including diarrhoea, choleraic diarrhoea, dysentery, etc.) which, in this country, noxious exhalations are commonly supposed to originate, we find the additions during the four hot months of the year from this class of complaints 26·3 below the average of the corresponding period of the three previous years, and 73 per cent. less than those of 1857. In another passage this distinguished physician says:—"It is nowhere sustained by evidence that the stench from the river and docks, however noisome, was in any way productive of disease. On the contrary, there was less disease of that form to which foul emanations are supposed to give rise, than usual."

Before these inexorable figures the illusions of half a century vanish in a moment.

But, to shew that sewage emanations may taint the air to the most intense degree without causing typhoid fever is not the only inference to be elicited from this vast experiment.

To draw from it all that it is capable of teaching, we must place it in contrast with another case, in which, in direct opposition to this one, exposure to sewage emanations, so far from being undergone with impunity, gave rise to this same fever on a large scale, and in a virulent form. For this purpose, there can be none better than the Windsor epidemic, to which I have before referred. As far as mere pollution with pythogenic compounds went, the air of the most ill drained house in Windsor, during the outbreak of fever there, must have been purity itself, when compared with the air on the banks of the Thames in 1858. Yet, while to breathe the former was, in a large proportion of persons, inevitable fever,* the latter had, as we have seen, no power to cause fever at all. Between the two cases there was, I need scarcely add, an essential difference in the nature of the taint, by which the whole of the enormous difference in the result is at once explained. In London, that which assailed the human nostrils, and penetrated the human lung, was the putrescent air of common sewage; at Windsor, it was the air of sewage, *charged in addition with effluvia from the specific exuviae cast off by the specifically diseased intestines of fever-patients*.

Under the pythogenic theory the facts in the two cases are absolutely inexplicable; under the theory which it is the aim of these papers to establish, they are at once and perfectly explained.

The intensity of the contrast in the two results—each so extreme in its way—gives to the evidence a twofold force, which seems to be irresistible in both directions, and, as conclusive in showing the exuviae from the fever-intestines of fever-patients to be possessed of an intense power to cause fever, as in proving common sewage to be entirely devoid of it. So that once again we may recognise here, in conditions incidental to modern society, the decisive verdict of a crucial experiment.

To the argument against the pythogenic theory of intestinal fever, founded on the prolonged absence of the disease in places where pythogenic compounds are rife, there is only one possible objection that yet remains to be disposed of. The specific poisons, it may be said, by which the exclusively contagious diseases—such as small-pox, for instance—propagate, by the very nature of the case, never cease from among us. But, although always somewhere extant, it is only now and then, when season and other conditions conspire, that they display their full power over man. To hold, because their action is often dormant, that it does not exist, would be simply absurd.

In the same way, it might be argued that, if fever is often absent where the agencies to which it is commonly attributed are rife, it is not because these agencies have not the power ascribed to them, but simply because the general conditions are wanting to give this power effect. It is scarcely necessary to

* Instances occurred in which nearly every member of a large family was almost simultaneously laid up with fever, in consequence of the escape into their houses of effluvia from the drains belonging to the infected quarter.

remark that the analogy on which this objection is founded is imperfect in all the points essential to give it force. But, supposing it were otherwise, and admitting the argument to have a *prima facie* claim to be considered, the circumstances which characterise the spread of this fever show at once that it does not meet the case. It requires but small acquaintance with the history of fever-outbreaks to know that the difficulty cannot be thus explained. Nothing can prove this more conclusively than the fact which may be witnessed every day in some part of the kingdom, that of two places in the same neighbourhood, situated exactly alike as to sanitary and other conditions, one may be the seat of a virulent epidemic of this fever, while the other remains perfectly free. In respect of defective sewerage, the place from which the disease is absent may be (as I have often seen) the worse of the two.

The admirable papers by Gendron de l'Eure on the epidemics of small localities; the writings of the illustrious Bretonneau; the annual reports of the French Academy of Medicine on the epidemics of France; and, lastly, not to add further to this list, the recent essay of M. Piedvache, are full of the most striking cases in point.

Examples of the same kind have occurred over and over again in my own practice. The epidemic at North Tawton, from which I have already drawn so largely, was a very complete one. I have already referred to that epidemic to show that the prolonged immunity from intestinal fever, which the village had previously enjoyed, was fatal to the hypothesis that common sewage emanations had any hand in the scourge which at length fell so heavily upon it. The violation of all reason involved in this hypothesis was rendered still more apparent by enlarging the field of view. For, at the very time when intestinal fever was so rife in North Tawton, all the other principal villages in the neighbourhood remained entirely free from it. And yet, not only were many of these villages far worse off than North Tawton, in respect of drainage, but there was one of them, the village of Exbourn, four miles away, that had long been a by-word in the country for its flagrant neglect of sanitary precautions. Pools of foul and stagnant water, dung-heaps, open cess-pools, and every other conceivable nuisance, abounded in the place. If impurities of the same kind were the cause of the fever which was raging at North Tawton, how did they happen to have no such effect here, where they were so much more rife? It could not be that the season was not favourable; neither could it be that there was no food for the disease. For when the same fever was introduced into Exbourn, fifteen months later, it spread there, also, with great virulence, and, as if to complete the demonstration, when it had already died away in its former seat.

This is a history which admits of but one interpretation. For, if upon the hypothesis that intestinal fever is caused by common malaria, irrespectively of contagion, facts like these are perfectly inexplicable, few, I presume, can have failed to perceive that, as incidents occurring in the erratic progress of a contagious disorder—such as this fever has been proved to be—they are entirely, and in every point, consistent with our other experience.

The history whose leading features have just been rapidly sketched in, is, in fact, emphatically the history

of a disorder of this kind. *Mutatis mutandis*, it is the history of small-pox; it is the history of measles; it is the history of scarlet fever; it is the history of malignant cholera. In all these specific contagions we meet with these same alternations of slumber and activity; of wide spread prevalence in one place, while other places hard by remain free; and finally, with the same successive invasion of neighbouring places, in such wise, that the reigning disorder—be it small-pox, measles, scarlet fever, intestinal fever, or malignant cholera—often only begins to prevail in the new locality when it has already died out in the old.

It is, in fact, in a general survey of this kind that we get the clearest view of the thread which really connects all these events. Running through all these circumstances, there is plainly but one thing constant; that is to say a specific morbid cause—a cause which is neither a permanent product of the soil, or air, or of particular seasons, but which is susceptible of transmission from place to place; which breeds as it goes, and then again dies out or becomes dormant, without leaving any sign to mark its track.

There is only one thing of which these can be the characteristics; and that is, the specific poison which is bred of the disease, and by which the disease propagates, and which, in common with the other specific poisons perpetuated by the same law, possesses all these properties.

Thus, when we come to scrutinise closely the course of this fever, even in these broad relations, we are again brought to recognise that which we have already proved by direct evidence; namely, its essentially contagious nature. This, as I have said once before, is the master fact in its history; the fact which governs all the rest.

POISONOUS SECRETION FROM THE TOAD. The slave population possesses an extensive acquaintance with animal and vegetable poisonous principles, and the study of their qualities and mode of use is conducted at dead hours and with the utmost secrecy, with religious rites. The initiated are formed into a sort of masonic association, and lose their autonomy to the extent of being often the murderers of those whom they hold most dear. Though they often give poison in revenge for offences even very trifling, the greater part of the murders are committed without reasonable motive, and from a capricious instinct of evil; sometimes from the will of the murderer, at others independent of this, and at the command of a superior. The Brazilian police have hitherto been unable to bring to punishment any of this sect, though whole families are known to have been rapidly murdered. Like the Indian thugs the poisoners do not often make whites their victims. These they sacrifice among their fellow-slaves, the favourite victims being children. I know a gentleman who lost fifteen slaves from poisoning in two months! The most humane proprietors suffer equally with those who are more rigorous! The most deadly poison known to be used by them is that of the toad. The skin of this reptile contains glands which secrete in abundance a milky glutinous fluid when the toad is put to pain or irritated. This is scraped off and dried. It produces incurable obstruction and enlargement of the liver and a speedy death. Some beat the toad with rods to make it secrete the venom; others place the animals in an earthen vessel over a slow fire. In the Zoology of Milne-Edwards nothing is said of the poisonous nature of this secretion of the toad. The poison of snakes is also used, and is very deadly.