Observations

ON

TYPHOID OR INTESTINAL FEVER: THE PYTHOGENIC THEORY.

BY

WILLIAM BUDD, M.D.,

SENIOR PHYSICIAN TO THE BRISTOL ROYAL INFIRMARY.

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

PART II. (Concluded.)

Intrusion of Sentiment into the Domain of Science. Miss Nightingale's Views. The Idea that the Specific Poison of Fever is generated by the Processes of Common Putrescence, irreconcilable with the intensely Specific Conditions which attach to its Reproduction in the Living Body. The enormous rate of this Reproduction adequate to all the Phenomena.

ONE of the most cardinal points in the history of the remarkable family of agents of which fever-poison is one, is, that predisposition in the subject is essential to the development of their specific power. Deadly as they are where this predisposition exists, where it is wanting they are of none effect. A given dose of carbonic acid or of sulphuretted hydrogen is fatal to all men alike; but of fifty men who receive an equal dose of the poison of small-pox, or typhus, or intestinal fever, as the case may be, some are poisoned unto death, while others remain unhurt. This is a difference, not of degree, but of essence.

What may be the *intimate* nature of the conditions essential to give effect to the fever-poison, or of those which defeat its operation, we are as yet in no position to define. How subtle they may be we may learn from that most mysterious of facts already once referred to in these papers, which consists in the immunity conferred by one attack against a repetition of the same fever.

In small-pox, this immunity has been proved by experiment on an enormous scale.* In the other contagious fevers, although not open to experimental proof, an immunity of the same nature has been deduced from observation, which may be the more readily trusted because the singularity in question (however unable we may be to penetrate the causes on which it depends) is evidently connected in some essential way with the peculiar law by which the whole family propagate.

Like many others already mentioned, this too is plainly enough a family characteristic. But what a marvellous characteristic it is! Here are two subjects who in their power to resist all common external agents are, as far as we can discern, precisely alike. Living on the same food, breathing the same air, nearly of an age, following the same occupation, alike in feature; the children, it may be, of the same parents; and equal, as far as can be judged, in nervous and other power. And yet in the one a few moments exposure to the specific poison is often

sufficient to cause death, while in the other a far greater exposure may be incurred for indefinite periods of time without the slightest ill effect.

To explain so great an enigma, chemistry can demonstrate nothing, and physiology can only vaguely speculate.* Neither in the flesh or the blood of the two men; neither in their form or feature, or any other attribute, is any trace to be discovered, by present methods, of a difference so momentous. But, whatever may be the nature of the conditions on which this difference hangs, they are all summed up in the fact that the man who suffers has never had the fever before, while he who escapes has already gone through it.

Over and over again, I have seen instances of persons who have remained perfectly well where every one else has suffered; and whose immunity could only be reasonably explained by the protection conferred by an attack of the same fever at some former period. The nurses of fever hospitals who have once had the disease remain, with few exceptions, for the rest of their lives entirely proof against it, although constantly exposed by their calling to greater risk of infection than ever occurs in any other condition of life.

But what is most striking of all is that the attack which confers the future protection may occur in childhood, and the protection, nevertheless, be lifelong. The child once marked with small-pox is proof against it as long as he lives, however early the date of the first attack; and in this, as we have seen, small-pox is but a type of the rest.†

The living substance, meanwhile, is in continual flux, and the body itself, to borrow the fine expression of Coleridge, is "but the common phantom of a thousand successors."

The case is even stronger than this. The figure of the poet, bold as it may seem, falls short of the truth. For it were vain now to trace in the finished man of forty or fifty either the form or the lineaments of the child who, in long past years, once had the fever. And yet, through all these changes of stature, form, and substance, the man of forty or fifty still inherits, as against this particular poison, the immunity which was purchased by the child in that one attack. Once dipped in the Styx, our Achilles comes forth invulnerable.

In the presence of relations such as these, it would seem as if science could only verify and record, without attempting to explain. So manifold, so subtle, so incomparably specific, when we come to examine them, are the conditions on which, even in the living body itself, the development of the fever poison depends.‡

* Some ingenious suggestions on the subject may be found in Liebig's "Agricultural Chemistry", under the head of "Fermentation"; and Mr. Paget has made some very interesting reflections upon it in his "Lectures on Surgical Pathology", as illustrating the incomparable precision of the assimilative act. Sir H. Holland has also treated the matter generally in an admirable and most suggestive essay, "On Diseases which occur only once in Life". But although these eminent men have no doubt hit upon important elements of the problem, their speculations must not be mistaken for an actual solution of it.

† When MM. Louis and Trousseau were sent by the French government to report upon the great epidemic of yellow fever at Gibraltar, they observed a great number of cases of striking exemption in persons who were infants at the breast when the disease prevailed epidemically there before; and who, to use the expression of the Gibraltar people, had sucked the fever with their mother's milk. (See Trousseau's *Clinique Médicale*—Lecture on Contagion.)

‡ If anything more were needed, in addition to all this, to show how specific a thing the reproduction of these poisons in the human

* The whole practice of vaccination is based upon an immunity—less in degree, but the same in kind—acquired by the inoculation of a modified form of the small-pox virus; viz., the vaccine.

To conclude, on the evidence usually assigned for such a belief, that a poison, of which this is the history, is bred in every cesspool or ditch in which there may chance to be a heap of seething rottenness, is precisely on a par with the philosophy which led the ancients to believe that mushrooms are bred of cow-dung, alligators of the mud of the Nile, and that bees, as Virgil sang, may be engendered in the entrails of a putrid ox. And signs are not wanting to show that the time is not far distant when the belief in question will take its place in that limbo of discarded fallacies to which these other superstitions have long since been consigned.

While, therefore, the great fact remains that the *cloacæ* which fill the office of sewer are the principal channels through which intestinal fever is propagated, the proof from all sides is overwhelming that they owe this faculty, not to their being receptacles of decomposing organic matter, but solely to their being, according to present arrangements, the depositaries of the specific discharges of persons already infected.

But if this be so; if the sewer only transmits the fever because it is tainted with the intestinal discharges of fever cases, there is no need of further argument to show that these discharges are incomparably more virulent than ought else that proceeds from the sick. For no one, I presume, who has made himself acquainted with the evidence which has been accumulated on the subject, or who has observed much for himself, can seriously doubt that of the conditions which promote the spread of this species of fever, imperfect sewerage is, beyond measure, the most effective.

For decisive illustrations of this, we need not go beyond the series of papers I have already published on this subject. The sufferers at Richmond Terrace, at Abbotsham Place, at the Female Orphan Asylum, and at the public school referred to in one of these papers, all drew their infection direct from the sewer, and had not once been in the presence of fever patients. (See, for an account of these outbreaks, the *Lancet* for Oct. 29 and Nov. 5, 1859.)

In each of these instances, the extent and severity of the outbreak showed a virulence and power of infection, to which nothing comparable is to be found in the risks of the sick chamber.

In a paper on the Nature of the Intestinal Affection, I had already arrived at the same conclusion by another path. (*Lancet*, August 1859.) What was there laid down as the result of theory, is here more than confirmed by an appeal to fact.

Of the many evidences of a very general recognition of some essential connection between this species of fever and the excreta from the human intestine, there is, perhaps, none more interesting than the suggestion made by that excellent observer, Mr. Michael of Swansea, that it should be named the "night-soil" fever.

So completely, indeed, in the public mind, is this fever identified with sewer-poisoning, and so insignificant in comparison has seemed the part which mere personal intercourse has taken in its propagation,

body really is, and on what intensely specific conditions it depends, it would be found in the fact, that the immunity acquired by one attack of these fevers holds good only as against its own particular poison, and is of no avail against the rest. Measles renders the body proof against measles, but leaves it as open to small-pox as before, and so on of the rest.

that the sewer has come to be looked upon as the actual and primary source of the disease, while the infected man has been altogether lost sight of. To such a degree has the prejudice thus arising operated, that not the vulgar only, but (until lately) even scientific men have refused to listen to the decisive evidence by which the disease is proved to be essentially contagious, and overlooking, thus, the bond which unites the two elements, have failed to discern the great truth that the sewer only owes its fatal influence to its connection with man; that it is but the channel for the distribution of a poison which it has no power to generate, and only acts in the work of dissemination by opening a wider sphere to the contagious principle.

In estimating the part which imperfect sewerage takes in the propagation of fever, we must not, of course, overlook its effect as a predisposing cause. Although I believe this effect to have been much overrated, I have little doubt that it is real.

In the first place, by promoting fermentation, there is some reason to believe that it may quicken the activity of the specific poison, besides assisting in other ways, to be hereafter explained, its access to the human body. Possibly, too, as I once taught, and as Dr. Carpenter and others have also surmised, the constant breathing of putrescent effluvia may, by communicating a putrescent tendency to the blood, render it more prone to the changes by which the specific poison is multiplied. Some part of the general results must, therefore, be put down to these heads.

On the other hand, it may be easily shown that the virus which issues from the intestines of fever patients is, in the form in which it is cast forth, made of very perishable stuff. Much of it is, no doubt, extinguished soon after its discharge from the body in process of natural change. Much, again, is often rapidly swept beyond the inhabited area by floods, or by effective drainage, and much too is dissipated in other ways. From these several causes, it is certain that by far the greater part of what is cast forth becomes of none effect.

This is but the expression of a general law. Like all other types in nature that propagate by germs cast loose upon the world, a myriad perish for one that again fructifies.

The ova developed by a single tapeworm would be enough, if they all came to their full estate, to people with tapeworm every extant human intestine. The spores of some dozen mushrooms would well nigh suffice to crop the planet with that fungus.

Where the springing up of heirs depends so much on chance, and may be defeated by so many contingencies, it is only by such lavish reproduction that the great law of continuous succession can be maintained.

"Autumn scatters its thousand seeds. Scarce one of the thousand Bringeth forth fruit; and the rest back to the element turn. Yet though one only expandeth its germ, that one only peoples Living creation with forms that through eternity last."[†]

What is true of organic life is, as I have elsewhere shown, true, to the letter, of these organic poisons also. (*Lancet*, July 23, 1859.)

While it must be admitted, therefore, that the influence of defective sewerage in the propagation of

[†] Tausend Keime zerstreuet der Herbst, doch bringet kaum einer Früchte; zum Element kehren die meisten zurück. Aber entfaltst sich auch nur einer, einer allein streut Eine lebendige Welt ewiger Bildungen aus. (Schiller.)

intestinal fever is compounded of two distinct elements, it is equally certain that what is gained on the one hand, in the way of predisposition, is more than lost on the other by the extinction or dispersion of the poison through the operation of natural causes. So that the total effect, far from being in excess of the full power of the specific poison which the sewer receives, falls, in reality, immeasurably below it. As this, however, is a point of speculative interest only, it is one on which I need not dwell further here.

Illustrations OF HOSPITAL PRACTICE: METROPOLITAN AND PROVINCIAL.

ST. GEORGE'S HOSPITAL.

A CASE OF EXCISION OF THE KNEE-JOINT.

Under the care of PRESCOTT HEWETT, Esq.

[Reported by EDGCOMBE VENNING, Esq., Surgical Registrar.]

WILLIAM B., aged 11, was admitted into the Hospital in February last, having four months previously been struck by a stone, behind, and about two inches above the left knee-joint. He did not feel much pain at the time; but the following day the joint became painful and swollen, and thus it remained up to the time of his admission; at which time, in addition to the general swelling of the joint, there was great pain, and that more especially over the inner side of the head of the tibia. No fluctuation could be felt; but there was great tenderness on pressure in this region; and the limb started very much at night. The movements of the joints were considerably impeded, both as to extension and flexion. The constitutional symptoms were very severe. A generous diet was given, and a ham-splint was applied, and cold lotion to the knee. From this time, notwithstanding all treatment, the disease of the joint progressed slowly but surely. Suppuration made its appearance. Various abscesses were opened at different times. Matters went on from bad to worse, and a consultation was held; at which it was determined that the joint should be excised, as the boy's general health was beginning to suffer from the long continued drain.

The operation was performed by Mr. Hewett on July 25th. A semilunar incision having been made from the inner to the outer side of the joint, the soft parts were dissected upwards, the patella was then cut away, the lateral ligaments freely divided, and the condyles of the femur thrust forwards; the diseased parts were then removed with a common saw, care being taken not to injure the epiphyseal cartilage. The condyles of the tibia were dealt with in the same way; after which, the cut surfaces of the bones were without much difficulty placed in good apposition, the soft parts being brought together with sutures, and the limb put into one of Matthews' swinging splints. During the whole of the operation but one artery required a ligature.

The examination of the parts which had been removed, showed extensive disease; the synovial membrane throughout being thickened and pulpy; the cartilages in many places eaten away by ulceration; and the bony structure softened, vascular, and infiltrated with stromous deposit.

The day after the operation, the boy's countenance was much improved; he had had a much better night than for some time past; and had suffered very little

pain; and, altogether, was going on as comfortably as possible. He was ordered a liberal diet, and some wine. Henceforth, the boy's general health improved rapidly; consolidation of the parts went on steadily; and he was discharged from the hospital on October 29th, three months after the operation, with solid union between the ends of the bones, and the operation-wound entirely healed; but the two old wounds, which had been made in order to evacuate pus before the operation, and which seemed to be connected with carious bone, still discharged a little.

On his leaving the hospital, there was only an inch and a half difference in length between the two limbs.

SOUTH STAFFORDSHIRE GENERAL HOSPITAL, WOLVERHAMPTON.

REPORT OF CASES.

By VINCENT JACKSON, Esq., Resident Surgeon, and
late House Surgeon to University College
Hospital.

I.—LARGE PIECE OF IRON LODGED IN THE EYE; DE- STRUCTION OF THE GLOBE; REMOVAL FOUR YEARS AFTERWARDS.

S. H., aged 16, was brought to the hospital October 10, 1861. His father said that for the last week he had been complaining of pain in both eyes, but especially the right. I was also informed by the parent that, four years since, whilst engaged in a manufactory, he suddenly received a blow on the right eye, and from that time had lost the sight in it. Immediately after the accident, he was seen by a medical man. No minute exploration of the eye was made. He continued under medical care for some time; but deriving little benefit, he discontinued it. From the time of the injury up to the period when I saw him, there had been constant pain in the right eye, as well as over the brow. A slight purulent discharge had also been noticed from it. Laterly, the left eye had become weak and painful at times; and it was especially on this account that I saw him. On opening the lids of the right eye, I saw a granulating projecting surface, with a central depression, and suspecting the nature of the case, I fixed the lids apart with the wire-speculum, and then passed a probe into the depression; its point quickly struck against a hard body, and this, after a little trouble, I extracted. It consisted of an almond-shaped rough piece of iron, weighing twenty-six grains, and measuring in length seven-eighths and in breadth three-eighths of an inch. Very little irritation followed its removal; and the boy was discharged cured in a very short time.

REMARKS. At the time of the accident, I suppose, the projectile must have penetrated the eye deeply, and probably lodged in the vitreous body, and behind the eye; at all events, it must have been beyond the curtain of the iris, or it would have been seen on examination. I think the case is a very good illustration of the line of practice required; for the persistence of the pain, and the continuance of purulent discharge, combined with an evident cleft in the disorganised eye, could lead to no other conclusion than that some foreign body or substance was the cause of it, and that, considering the photophobia and increasing asthenopia in the left eye, the sooner such foreign substance was removed the better.

II.—DISLOCATION BACKWARDS OF THE LEFT HIP; RE- DUCTION BY MANIPULATION, WITHOUT CHLOROFORM.

T. M. R., aged 32, was admitted May 31, 1861; occupation, a collier. Just two hours previous to admission, the patient, whilst working in a coal-pit, received a large piece of earth on his back; he was immediately forced down, and he found himself unable to move. The pa-