

it being still necessary to hurry him to the door—the same noise bringing on a fit. All this time the bowels acted very sluggishly, but the urine was passed generally regularly. The intelligence throughout was perfectly good, and he took his food well, which consisted entirely of milk and brandy—sometimes drinking two quarts of fresh milk in the twenty-four hours. He appeared always better for an hour or so after food. The brandy, which at one time was given pretty freely, was quite tolerated.

It was not till July 14th that there appeared for the first time a change for the better. From this day there was gradual improvement, chiefly indicated by a longer interval between fits of spasms. On July 22nd, he sat up. On the 23rd, he walked across the room with the aid of his mother. On the 24th, the wedge was taken away; he was induced only with the greatest difficulty to allow this to be done. He now took solid food, and each succeeding day gained strength and advanced to convalescence rapidly. The treatment throughout was muriate of morphia, with tincture of cannabis Indica.

On the evening of June 29th, when the first symptoms appeared, a draught with solution of muriate of morphia and tincture of cannabis Indica (a drachm of each) was administered. This was repeated every second hour; and the wound was dressed with a bread and water poultice, with half-an-ounce of opium in it. Next morning, his mother said he had got ease after each dose. For two or three days these draughts were pretty regularly given. Having waited myself on more than one occasion after medicine was given, I did perceive relief—there appeared some slight indication of sleep, and the fits that came soon after were less violent and painful. After a few days, when he became extremely ill and his parents lost all hope, it was with the greatest difficulty that I got the medicine given. I always found on my visiting the following day that there had been much neglect. On the fourth day, two drachms of each of the above drugs were given; and this was adhered to, as well as could be done, for nearly three days. Each day got over was in itself most material to the hope of final recovery. I did not further increase the doses, as I feared the stomach might refuse food. The bowels were kept open by enemata.

There are many points of interest in this case. The child, though young, appeared to tolerate the morphia and cannabis Indica without the semblance of any physiological effect. The illness was very prolonged, from the 29th June till 14th July, with very few remissions from the violent spasms under which he laboured. The digestive powers remained intact, and the appetite was good throughout, and, contrary to all expectation, the boy recovered.

The case must be looked upon as acute; the almost uninterrupted and violent spasmodic state of the whole frame, accompanied by the most intense agony, both mental and bodily, prevent us from even considering a subacute attack. It is difficult to know what value to put upon the morphia or cannabis Indica. I believe that some good was gained, for I watched the effects on several occasions. I considered a combination of these remedies safer than larger doses of either alone; but I look upon the liberal supply of nourishment taken as the one great and happy feature, and of more use than we are justified in assigning to any drug. Throughout, the lad drank with avidity, and the urine was passed in regular quantities. The left side was the most violently contracted under spasm. The pulse was very irregular during the fits. It was interesting to note that no advance in the healing of the wound was gained during the period of tetanus. The boy has since regained his natural strength and robustness, although for some considerable time he had a markedly contracted look about the neck and shoulders—the latter were drawn much forward and upward. The numbers noted with reference to temperature, respiration, and pulse refer to periods intervening between the fits.

Query: Would amputation on the evening of June 29th have been advisable?

THE CAUSES OF THE CONTAGION OF TYPHOID FEVER.

By M. K. ROBINSON, M.R.C.S.,
Medical Officer of Health for East Kent.

It is generally admitted that enteric fever is a communicable disease, and that its specific virus is cast off along with the feces by the bowels. Concerning the physical characters of the poison, however, ignorance has yet to be pleaded. The microzymes or particles are so minute and subtle as to defy our present powers of penetration into the mystery of their existence; and this cannot be wondered at, supposing their size to be but one-twenty-thousandth of an inch in diameter, and that they do not differ in their power of transmitting light from the media in which

they are suspended. Dr. Burdon Sanderson has adduced considerable evidence in proof of contagion being neither soluble in watery fluids nor yet capable of assuming the form of vapour without losing its properties, and thus has shewn, that this indiffusibility and particulate character offer a ready explanation of the escape at one time, and affection at another, of those exposed to the incidence of contagious particles under similar circumstances, dilution in fluid matter or distribution through the atmosphere not diminishing the potency of the particles, but rendering their chance of impinging on a given surface more or less probable, according to the extent of such dilution or distribution.

Cast off from the diseased body, enteric virus finds its way into cess-pools and sewers. The etiology of enteric fever has been so intimately associated with sewer-gases and sewage-polluted water, that some have inferred that the disease may arise, *de novo*, from the products of fecal fermentation. Leaving, however, the question of spontaneous generation, exertion of disease-force through dead matter or living cells, in the hands of those who are devoting their special talents and attention to those recondite questions, I will proceed to the consideration of the vehicles by which the poison of enteric fever is conveyed. Three such vehicles or "carriers" have, from time to time, been recognised, viz., air, water, and milk. Innumerable instances of sewage-polluted air have been noticed in connection with outbursts of enteric fever. Dr. Murchison, in his valuable monograph, recites remarkable instances of this mode of conveyance (notably the Croydon and Windsor outbreaks); of which examples he remarks "that the poison appeared to be conveyed in the volatile emanations from drains, cesspools, etc. During the time I held the post of medical officer of health for Leeds, about five thousand cases of enteric fever (*i.e.*, including sickness and death) came under observation; and of these seventy-five per cent. occurred in houses where either the house-drainage was defective, or otherwise those attacked dwelt in an atmosphere intensely charged with fecal matter. The water supplied to the fever-stricken houses was identical with that consumed by the healthy inhabitants, and the prominent non-sanitary difference of circumstances in the two classes (affected and exempt) was the atmospheric impurity attending the condition of the former.

That water is another vehicle by which the poison is often conveyed has been clearly demonstrated. I have seen many examples of such conveyance. One striking instance I well remember, where about sixteen persons were attacked, who preferred to draw their water from an open well, instead of availing themselves, like their neighbours, of the public service; into the well a drain overflowed, which communicated with a house where the first case (an imported one) occurred in the village.

But, perhaps, the most interesting carrier, because the one to which public attention has been most prominently directed of late, is that of milk. Dr. Michael Taylor of Penrith recorded, in 1858, an outbreak of enteric fever in that town, which he traced to fever-poisoned milk. He accounted for the conveyance of the virus to the milk in one of two ways; first, either by deposit from the hands of the woman who performed the double duty of nursing the sick and milking; or, second, by absorption of the poison during the exposure of the milk in an atmosphere of fever-miasms. The addition of foul water to the milk, either by accident or design, Dr. Taylor considered impossible, as the only available supply was derived from the public service of pure water from Ullswater.

Dr. Ballard, in an admirable essay, described a localised outbreak of enteric fever at Islington, in the year 1870, which he had traced to the use of milk polluted, through the agency of water, by enteric dejecta.

During the summer and autumn of last year, it fell to my lot to be engaged in the investigation of two epidemics of enteric fever associated with milk-conveyance. One of these has been specially reported on by Dr. Ballard; and his deduction was that, as in the Islington outbreak, water acted as the conductor to the milk. In the second example, reported by myself, the coincidence of communication between the infected farm whence the supply of milk was drawn and the fever cases was strikingly manifest, the fever marking with unerring certainty the trail of the milk-purveyor. In streets where only one, two, three, or four houses were invaded, these were the only houses in the same streets supplied by the milkman in question. Altogether eighty persons, who obtained their milk from the infected source, where six cases of fever had occurred, contracted the disease, fourteen of whom died. The water-supply of the infected farm (which was the source of the milk in question) was derived from a spring having its origin and delivery, not only removed away from, but above the level of the ground on which the house and outbuildings were situated; consequently, pollution of the water by percolation or gravitation from the sewage of the premises was physically impossible. The water itself yielded no evidence of pollution, and the milk, from its reputed character and other evidence, was totally unsuspected of dilution? How, then, did the milk become con-

taminated? I could only account for this on the supposition of absorption by the milk of fever-particles from the atmosphere of the premises. The privy and house-drainage flowed on to the surface to join a semiliquid manure-heap close to the stable where the cows were kept and milked; and probably the warm fresh-drawn milk proved an attractive pabulum for the fever-particles, which, it could be easily conceived, might be given off from the reeking mass of filth already described. Against this theory, doubtless, may be advanced the argument, that enteric fever is not, like typhus and relapsing fevers, often conveyed from the sick to the healthy by atmospheric influence; but may not this arise from the fact of the poison being contained chiefly in the faeces, the offensive character of which causes their quick removal from the sick room?

I remember, amongst other instances, the case of a fruiterer's girl who had been strictly kept to attend the shop, whilst her mother tended a fever-afflicted boy segregated in an upper room of the house. The girl remained perfectly well until one day, on an emergency, she went to the sick room to assist the boy from a night-commode. The offensive odour brought on vomiting, and from that time she sickened and went through a well-marked course of the disease. Both the mother and girl emphatically dated the commencement of the illness from the time she entered once, and only once, the sick room as above narrated. The period of incubation was here of the shortest possible duration, but not, I believe, without parallel.

If, however, the particles of enteric fever poison can thus be conveyed as air-borne particles, if they can accompany sewer-gases in a like manner, what difficulty is there in assuming that milk (an article most susceptible of atmospheric influences, such as electrical disturbance, possessing, moreover, the property of becoming rapidly impregnated with the characteristic taints of surrounding substances) should attract and form a genial soil for the floating virus of this fever?

If this point be conceded, water, as an intermediate vehicle, need not always be considered such an essential element in the connecting chain of propagation as some appear to imagine, and the question may fairly be raised, which of the two media acts most frequently the part of a carrier between enteric fever evacuations and milk—air or water?

EMBOLISM OF CENTRAL ARTERY OF RETINA.

By PRIESTLEY SMITH, Esq., Birmingham.

THE subject of the following case was, at the time of the occurrence, an out-patient of the Birmingham General Hospital on account of disease of the heart, under the care of Dr. Russell. Through Dr. Russell's permission, I had the opportunity of keeping the case long under observation, and of examining the eye after death.

Charles T., aged 58, coach-builder, came to the Eye Hospital on June 4th, 1873, complaining of blindness of the right eye. The following is extracted from the notes of the case. Seven days previously, while sitting quietly in his chair, he felt, as he believed, the right eyelid close over the eye. Putting his finger to it, he found, to his astonishment, the eyelids open. The sight of the eye was entirely gone. He felt no pain, headache, or giddiness, either at the time or since. The loss of sight was, he says, quite instantaneous. The eye had no perception of light since. The movements of the globe, and the external appearance were normal. The pupil was of medium size; it did not respond to light; it acted in association with its fellow. Vision was absolutely lost in all parts of the retina. The media were clear. The disc, especially its margin, was much obscured by a white hazy halo. The retina was rather hazy throughout, but much more so around the disc than at the equator, where the choroidal plexus was just discernible. The situation of the macula lutea was marked by a dark reddish dot, surrounded by a white hazy halo, which shaded off gradually into the red of the surrounding region. The retinal arteries were pale, and reduced to very fine lines, visible only on careful examination. The retinal veins were somewhat below the normal size, and presented the following appearance. Each of the two primary trunks, as it emerged from the disc, was of about half the natural size; passing outwards, it increased considerably up to its first bifurcation; each of the branches arising here began as a very fine trunk, and then, in like manner, gradually increased in size up to the next point of division. The next branches did the same, and so on throughout; so that the whole venous system of the retina, instead of gradually lessening in diameter from the disc towards the equator, as in the natural state, presented a series of reversed enlargements and sudden diminutions. The point of maximum size was, in every instance, just on the discal side of a bifurcation. Upon the white halo around the macula lutea, the ultimate venous ramifications stood out in a striking manner. The left eye appeared sound in every

way. The patient had a loud double aortic murmur, the systolic portion being almost musical in character. He had rheumatic fever a year ago, and believed he had had previous attacks also.

On June 23rd (twenty-six days after the occurrence), but little effusion remained in the fundus. The retina was clear; the choroidal plexus was everywhere clearly seen. The disc was whiter than at first; still rather ill defined, though much clearer than before. Some whiteness still remained around the macula lutea in the form of a double zone, the inner closely surrounding the central dot, the outer separated from this first by an almost complete ring of clear red. The veins were smaller than before at the disc, but a little larger than the arteries; at the equator rather larger than at the disc. There was no appearance of collateral circulation. He had no perception of light.

On August 12th (eleven weeks after the occurrence), the disc was very white, the fibrous stroma clearly seen. The arteries were very fine, but distinctly visible; the veins rather larger than the arteries, especially at the equator. The macula lutea was hardly to be distinguished. He had no perception of light.

Just four months after the loss of sight, the patient died in the General Hospital. The aortic valves were found to be the seat of very extensive disease. Two of the valves were fused together into a thick unyielding warty mass. The third valve retained some mobility, but was also much thickened and studded with excrescences. The right optic nerve was found to be somewhat shrunken throughout the whole of its length. A transverse section of the nerve, immediately behind the globe, showed, under the microscope, that the central vessels had undergone marked changes. The vein was patent, but much smaller than that found in the average healthy nerve. Unfortunately, I had not thought of removing both nerves for the purpose of comparison until too late. The artery, as a tube, was no longer in existence; its former position was, however, clearly indicated by a well defined circular mass of concentrically arranged fibrous tissue adjacent to the vein.

OBSTETRIC MEMORANDA.

TREATMENT OF *POST PARTUM* HÆMORRHAGE.

VII.

THE means of suppressing *post partum* hæmorrhage have been most ably discussed in the pages of the JOURNAL; but I think scarcely enough attention has been paid to the means for its prevention.

Although I never had a fatal case, yet, in my early practice, it was my lot to meet with two very alarming ones. Subsequently, I noticed that, although there might be no large loss of blood, the sudden evacuation of the contents of the uterus, especially when there was a large quantity of liquor amnii, was often followed by death-like faintness. Even in tapping for ascites, it is always laid down as a rule to apply a bandage, which is gradually tightened as the fluid escapes, to assist the abdominal muscles, and to compensate in some measure for the loss of pressure sustained by the large vessels and viscera of the abdomen. If, then, such precautions are necessary in a case where the evacuation of the fluid is entirely under control, why should not similar precautions be taken in the emptying of the uterus? Most practitioners, no doubt, apply a binder, but not till the uterus has emptied itself, and the large blood-vessels of the abdomen have become turgid with blood from want of that support to which they have for months been accustomed. I was led by such considerations to adopt the plan of using the binder, not only after, but during labour; and, as since then I have not had a single case of *post partum* hæmorrhage, or even of that sudden exhaustion which I had before so often witnessed, I am induced to describe the plan which I adopt uniformly in all labours, and which I have found successful.

I select some stout material, wide enough when doubled to reach from the fundus of the uterus to two or three inches below the *crista ili*. This, as soon as the woman is confined to her bed, is pinned as tightly round her as can be borne, thus giving support to the abdominal muscles, and keeping the child in the axis of the pelvis. As soon as true expulsive pains commence, the binder is unpinned, and the upper fold given into the hands of the nurse, with the directions that, during each pain, she should draw it as smoothly and tightly as possible across the patient's abdomen. There is no fear of the lower fold slipping, as it is kept in position by the weight of the woman's body, and therefore should be left quite alone. As soon as the head begins to emerge beneath the pubes, the pressure should be continuous and as strong as possible, and never relaxed for a single instant till after the child is born and the placenta expelled, when the binder should be pinned as tightly as possible by the surgeon himself, and not left, as is too often done, to the nurse.