

Some Features of the Recent Outbreak of Enteric Fever at Omagh District Asylum (1). By PATRICK O'DOHERTY, B.A., M.B., B.Ch., Assistant Medical Officer, District Asylum, Omagh.

THOUGH the subject of enteric fever would not seem to come within the purview of this Association, yet special features, mental and otherwise, of the outbreak in Omagh Asylum in the end of last year prompted me to put some of the facts before the members of the Irish Division. They will pardon me if they find my remarks rather bald, being mere records of observations, but I hope they will not be altogether uninteresting.

The history of enteric in Omagh Asylum dates back, as far as I learn, some fifteen or sixteen years, during which period it might be described as endemic. In 1895-96 a very formidable outbreak occurred, rivalling in many ways the recent one. At that time the buildings were in course of reconstruction, and the whole sewage system was remodelled and renewed. Since 1900, from which date only has a record been kept, no single year has been free from enteric, and in the decade ending 1909, 67 cases are recorded. The majority of these occurred in 1905, 1906, and 1907, when there were 44 cases. On that and on previous occasions the cause was investigated, but without definite result. During 1908, 1909 and 1910 there was a lull, when only 8 cases are recorded, and hopes were raised that we were about to get rid of the scourge. Two cases only occurred in the early months of 1911, but with the advent of October we were made to realise that the dreaded microbe of Eberth was still in full vitality in our midst, and that it still found the surroundings congenial and the pasture good.

During the succeeding three months no fewer than 92 cases occurred, and these, with 4 occurring in the first month of this year, brought the total to 96. Of these 69 were patients (49 males and 20 females), 10 of the male staff (including 4 artisans), 11 nurses, and 6 cases in the asylum surroundings, but not of the staff. The chief incidence was on the male side, where 59 cases occurred; October was our worst month, when 55 were attacked. Twenty-eight occurred in November and 7 in December. The first two cases occurred in the last

few days of September, when it will be remembered there was a break-up of the long drought—a matter of some significance, as will be seen later. The deaths numbered 17, 16 patients and 1 nurse, giving a total mortality of about 17 *per cent.*—24 *per cent.* of the male patients, 20 *per cent.* of the female.

The type and severity of the attacks varied widely. Rose spots and diarrhœa were not prominent features; enlarged spleens were frequent, and the complications ran the whole gamut, pneumonia, thrombosis of femoral vein, perforation, and hæmorrhage heading the list. There was one instance each of parotitis, periostitis of tibia, spondylitis, cystitis, thrombosis of the mesenteric veins, and of subcutaneous abscess. Two cases had pulmonary tuberculosis as sequelæ, but whether the disease existed before or was consequent to the enteric, I am not prepared to say. One case ran an apyrexial course throughout, and on this I shall remark later; a few cases had hyperpyrexia; one of these had a temperature of 107° F. and died of profound toxæmia.

Of the 17 deaths the immediate causes were in 6 cases toxæmia and heart failure, in 4 pneumonia, in 3 perforation, in 3 hæmorrhage from bowel, and in 1 thrombosis of mesenteric veins. In 5 cases we were able to have *post-mortem* examinations; in 2 of them perforation was found, in 2 pneumonia, and in 1 thrombosis of mesenteric veins. In a sixth case, which afterwards died of pulmonary tuberculosis, the scarring of the intestinal ulceration was seen, and a curious plastic peritonitis.

Out of a total of 22 male epileptics on the register, 7 were attacked; of these 5 died. It is to be remarked, however, that in addition there were 3 other cases of patients from the same division and 3 attendants. No female epileptics were attacked, and a curious thing I observed was that no fits occurred during the course of the disease, though previously to their illness some of the men were having as many as 100 fits in a month.

The ages of the patients varied from nineteen to seventy-seven, and though the deaths were more numerous amongst the younger ones, relative to their number the older patients showed the greater mortality.

The general treatment adopted was the usual one—nursing and milk diet. Many of the cases needed no medicinal treat-

ment. Some were given quinine alone, some salol, and others Murchison's quinine chl. mixture. Our observations did not point to the superiority of any particular drug.

As to diagnostic methods, a few points are worth dwelling on. The Widal test was done in six cases; three of these gave a negative reaction and three positive. The first case of the epidemic—a male patient—was taken ill on September 26th. He presented equivocal signs, and was variously diagnosed as gall-bladder trouble with jaundice, and appendicitis. Not till the fourth week was enteric diagnosed. Widal gave a negative reaction; as it happened he died on the same day that a blood specimen was taken, and a *post-mortem* showed typical typhoid ulcers with perforation. Early in the epidemic we began to employ the Russo-urine test, and, as results showed, it proved most valuable. In all, 74 enteric urines were examined, with only 9 negative results. The Diazo reaction was much less valuable in our hands; out of the same number (74) of urines, 23 were negative. One case especially showed the value of the Russo test—the apyrexial one mentioned above; this man showed the usual symptoms in a mild form, but with normal temperature; medical opinion was divided as to the diagnosis. Russo test was done during the first week and proved positive, while Diazo test was negative. On the fifteenth day the serum gave a positive Widal, which removed any doubt as to the diagnosis of enteric. This case ran a normal course, and was convalescent in the fifth week.

To find the cause for such a formidable outbreak naturally engaged our anxious attention, and for a time it baffled our inquiries. There was no enteric in the neighbourhood, and the patients attacked were not new admissions, nor were we able to fix on any individual as a likely typhoid carrier. The milk and water supply were naturally suspected. We derive our milk from three sources, the asylum farm and two contractors, but we found no reason to suspect any of the three, and samples of the milk submitted for analysis were found to be bacteriologically pure. Our water supply is derived from a deep well sunk in close proximity to the laundry buildings for a depth of 80 ft., and penetrating the limestone rock for some distance. It is lined with cement-pointed brick for the greater part of its depth, and afforded an ample supply for ordinary drinking,

culinary and bathing purposes; a softer water derived from the river is used in the laundry. This well had hitherto been considered to be above suspicion, nevertheless we took the precaution of having the water boiled as far as it was possible and had it examined bacteriologically. The bacteriologist reported it free from typhoid bacilli and all sewage organisms. This was early in November. Later, an engineer was employed to test the drains and inquire generally into the sanitary arrangements. The drains, newly laid fifteen years ago, were found to be in a bad way; nearly all the branch drains were leaking, though the internal plumbing was staunch in every detail. He took three samples from the well—of the water itself, of the matter found oozing through the brickwork, and from the rock below. All three were submitted to the bacteriologist; no typhoid bacilli were found, but all three contained *B. coli* in large numbers, and one of them *B. enteritidis sporogenes*. Recent pollution by excremental matter was indicated by the presence of *B. coli*, and the presence of *B. enteritidis*, which is a spring organism, indicated pollution that may not have been recent.

The failure to find the *B. typhosus*, which is notoriously elusive in such bacterial mixtures as naturally exist in the soil, was in no way consolatory, as nowadays indirect evidence as to its possible presence is sufficient to condemn a water. From that time there was no doubt in my mind that the water was the cause of the outbreak, and, moreover, had been the cause of all our trouble in recent years. Needless to say we ceased to use the well, and fortunately were able to obtain the town supply, which is laid on to the asylum, but only used in emergencies. The time of the year, just as a prolonged drought was breaking up, and when considerable movements of the surface and subsoil waters were taking place, and the widespread nature of the epidemic over every portion of the asylum, went further to point to the water as a cause, and, curiously enough, before we suspected the well, an attendant volunteered the information that all the patients attacked in his division were noted water-drinkers.

Several propositions as to the cleaning of the well with a view to its further use were made, but ultimately more sane advice prevailed: an ocular demonstration of surface water forcing its way through the brickwork of the sides and trickling down in large amounts finally determined the Committee

to abandon the well altogether. This has been done, and an artesian boring is being made at another site.

The Committee have also undertaken the relaying of the defective sewers, which is now well under way, and the laying open of these justified in every way the evidence of leakage as given by the preliminary tests. Whole lines of pipes were cracked, especially at the joints. The engineer and workmen explain this as due to the expansion of the Portland cement used in making the joints, also to the large amount of water at high temperatures, often little short of boiling-point, entering the sewers. The pipes were in some cases improperly laid. The new drains are in some cases metal, but mostly of good quality stoneware laid on and embedded in Portland cement, and all the joints are made with Medina cement. In many cases exhaust steam also had gained entrance to the sewers, and in one instance could be seen issuing from a ventilator near a window where some attendants slept. It is interesting to note that in this location—a passage between blocks—no less than six cases occurred. We were inclined to attribute some importance to this fact before we discovered that the well was polluted; a case having some bearing on this is given by Sir Wm. Whitla, where exhaust steam having access to a drain forced the traps and gained an entrance to a Hospital ward, filling it with moist vapour, an outbreak of enteric occurring shortly afterwards.

Two other points alone remain, *viz.*, the effect the fever had on the mental condition of a number of the patients, and secondly, the deterrent effect the epidemic had on the minds of the public, resulting in a diminished admission-rate. Out of the total of 53 patients (leaving the deaths out of the count), 20 showed appreciable mental improvement. Of these 13 were discharged recovered within a few months of their illness, three went home relieved, and four remained in the house, but improved. Of those discharged one only has returned up to the time of writing, while two of those remaining relapsed. These cases were mainly adolescents, and had been in the asylum for periods varying from five months to seven and a half years; five of them were recurrent cases, chiefly maniacal and melancholic, one was a case of primary dementia, who did not recover, and one of delusional insanity. This latter case is of special interest; he had been in the asylum for seven and a half years,

his delusions seemed fixed, and he was to all intents and purposes chronic; another case looked on as chronic melancholia had been a patient for two and a half years.

I do not wish to unduly urge this point, as the improvement or recovery in many of the cases may prove to be merely temporary, as has been the case in three of the known cases, but that such improvement as did occur can be directly attributed to the fever does not admit of any reasonable doubt. And this question occurred to me: Could the careful dieting, etc., to which they were submitted over long periods have had any bearing on the matter? I should be glad to know if any other member has had any similar experience, or has read of such.

As to the second point, the decrease in admissions was quite remarkable. During the six months preceding the outbreak, April to September, 1911, the monthly average was 17, as was the monthly average for the whole year, 1911. During the months October, 1911, to March, 1912—the enteric period—the monthly average had fallen to 12. Since April the numbers are again increasing, and the average for the three months, April to June, has been 20. The net result has been that during the six months ending April 17th there was a reduction in the numbers in the house of 34. The deaths from enteric and the discharges would partly account for this, but not wholly. The numbers are again approaching their original figure.

As to the general aspect of such an epidemic as this, one has to actually experience it to realise the amount of confusion it entails, for not only had we to nurse and care for those of the staff who were stricken, but their places had to be taken by raw hands unaccustomed to the work, and in some cases reluctant to come in at all. On the female side this was most felt, as almost a third of the staff were down at the same time. In addition there was the difficulty of providing accommodation for the six or seven trained nurses in an already overcrowded asylum.

It must be said as a tribute to our staff that all responded willingly to the strain put on them, and merited the highest praise. In conclusion, I have to thank my Superintendent for permission to make use of the information herein set forth, and you for your patient hearing.

(¹) A paper read at the Summer Meeting of the Irish Division held at the Derry District Asylum on July 2nd, 1912.