the prophylactic treatment. In later stages there is still a very large proportion of cures in previously untreated cases. It is only when one has to deal with other people's failures that the results are not so good; yet many of these may be healed when treated drastically, and others can be kept in good health for many years. Cosmetically, the results in early cases will astound those who are not accustomed to this method. It is often difficult to discover where the lesion has been unless one knows where to look, and I have had cases where the second prophylactic dose was difficult to apply, owing to the absence of scarring. Careful notes and diagrams

must therefore be kept. We obtain ever a larger proportion of early cases as medical practitioners and surgeons get to realize the value of the newer treatment. As the public get to know of it they do not fear to come early, as there is no question of operation. Let us hope that those who use unfiltered radiation will soon discard this in favour of safer methods; our results will then be even better. Anyone whose statistics do not show more than 90 per cent. success in all cases, early and late, and something of the order of 99 per cent. in early cases, would do well to consider carefully what he is doing, and revise his methods.

THE DECLINE IN THE DEATH RATE OF DIPHTHERIA COMPARED WITH THAT OF SCARLET FEVER

BY

L. COBBETT, M.D., F.R.C.S.

For scarlet fever there is no specific treatment; for diphtheria we have had antitoxin since 1894; yet the death rate from the former disease has, as everybody knows, diminished almost to extinction, while that of the latter has undergone only a gradual and moderate decline. For the benefit of those who, like myself, do not readily take in the significance of rows of figures until they have been put into graphic form I append two charts compiled from the numbers given by the Registrar-General of the death rates of children under 15 years of age from these diseases during the last seventy-five years.¹

The chart for diphtheria certainly would not lead a layman to suspect the marvellous potency of antitoxin. Yet any pathologist who, having carefully estimated the minimal fatal dose of a diphtheria toxin for the guinea-pig, proceeds to measure out enough to kill one hundred thousand of these animals and adds to it a single cubic centimetre of a good antitoxin serum, and then finds that he can inject the mixture into one of these animals without any serious consequence, cannot but be disappointed that its universal clinical use has not been followed by more striking results, and wonder whether it is being employed in the best possible way.

As Ehrlich pointed out years ago the secret of its successful use is early administration. Cohn in 1904 published some figures for 1,000 cases treated in the Moabit

Hospital in Berlin, classified according to the day of treatment. Of those treated on the first day only 1.3 per cent. died, while of those treated on the fourth day 24.7 per cent. died. The Metropolitan Asylums Board long ago published a similar analysis of over six thousand children treated at the Brook Hospital. The mortality according to the day of treatment was as follows:

Day when antitoxin was given ...	1	2	3	4	5+
Number of cases ...	250	1,513	1,690	1,338	1,765
Mortality... ..	0	4.29	11.25	15.89	18.52

These figures ought not to be forgotten. May I be allowed to give an experience of my own which impressed me greatly at the time?

During the little epidemic in Cambridge in 1900-1 there were many cultures of diphtheria bacilli in the laboratory. The disposal of these caused me some anxiety, because a proportion of our staff were quite young boys. One day, missing one of these youthful attendants, I inquired where he was, and was told he had not turned up, and learnt, on further inquiry, that he had complained of his throat being sore on the previous evening. Armed with a syringe and antitoxin, I went at once to his home and found him in bed, quite ill, and very unwilling to be disturbed in any way or to sit up and be examined. On looking at his pharynx I thought I saw a little patch of commencing membrane; and a swab taken at the time yielded, next day, a culture of diphtheria bacilli. I did not, however, wait for the result, but injected antitoxin immediately.

With the intention of giving a prophylactic injection to his little sister I called again in the afternoon, some six or seven hours after my first visit. I then found my patient, who was so ill in the morning, sitting up, demanding his tea, and banging about with an illustrated newspaper that had been given him to read, but which he had rolled up into a club and with which he was vigorously whacking the bed.

¹ Statistical Review, England and Wales. Tables, Part I, Medical Table 9.

While the outbreak lasted I, acting on behalf of the medical officer of health, visited all the homes where there were children known to have come into contact with notified cases. In this way I saw several incipient cases of diphtheria, and never failed to find that antitoxin cut them short at the start.

Let us look a little closer at the chart of the death rate from diphtheria. There is no decline worth noting in 1894 when Behring's antitoxin was first broadly introduced to the medical world by Roux at Budapest. The reception of antitoxin was very lukewarm in Great Britain, as I showed in an article I contributed to the *Edinburgh Medical Journal* in 1900, though much more striking results had been obtained in Paris and Berlin. From 1894 to 1902 there was no decline in the death rate in England and Wales, but there was then a fall, after which for twenty years the death rate remained about two-thirds of what it had previously been, at first declining slowly until 1910, and then advancing again towards 1920, with a slight rise during the war. In the four years after 1920 it dropped to the lowest point it has ever reached—namely, to 231 per million children under 15 years of age, or 21.5 per cent. of what it was in 1894—after which it has risen a little.

The result of the use of antitoxin during a third of a century or more, though by no means to be despised, cannot, then, be anything but disappointing to those who have realized its amazing efficiency in the laboratory, and raises the question whether still better results might not be obtained if the best possible use were made of it. I cannot help feeling that in many cases it might be given much earlier than it is. The pernicious practice of relying on laboratory diagnosis instead of having the courage of their own opinion, has led practitioners to wait for the result of the examination of a swab, and has prevented the early use of the remedy.

Let the doctor then *never* wait for the swab, but give antitoxin with the least possible delay whenever there is a reasonable suspicion of diphtheria. And when diphtheria is prevalent in his district let him not omit to carry with him a syringe and a bottle of antitoxin, lest he lose the few precious hours during which alone this wonderful remedy is able to save life.

It might perhaps be argued that the success of antitoxin in the treatment of diphtheria has been, to some extent, masked by a transference to that disease of cases that would formerly have been put down to scarlet fever, owing to a change in the criterion of diagnosis.

Now from the time when Bretonneau first distinguished diphtheria from scarlet fever the criterion of diagnosis was the presence or absence of a membrane in the pharynx. But by about the last decade of the nineteenth century the discovery of the diphtheria bacillus, and the increasing degree of certainty with which it might be cultivated from a swab and identified, was gradually leading to the substitution of the presence or absence of the bacillus for the presence or absence of a membrane.

This change undoubtedly led to many cases being diagnosed as diphtheria which would not otherwise have been so classified; but as such cases were non-membranous, they were almost invariably mild ones, and could not have added anything material to the death rate of diphtheria, while they must have greatly tended to reduce the case mortality. For the same reason the transfer of such cases to diphtheria, even if the majority of them would in former years have been classified as scarlet fever, could not have reduced the death rate from that disease. Moreover, the great and dramatic fall in the death rate of scarlet fever had taken place before the new method of diagnosis had come into use.

The fall in the death rate of scarlet fever from one or two thousand per million children under the age of 15 to no more than forty-five in 1931 has not been

accompanied by any great change in its prevalence, at least since the beginning of this century, as Miss Hilda M. Woods has recently shown. It is the severity of the disease which has changed.

Diphtheria, on the other hand, has not become milder: an increase in the numbers of cases so diagnosed, owing to the change of method, has no doubt led to a fall in the case mortality of the disease; but the disease, when the old-fashioned signs are well marked, seems to be as deadly as ever, and it is only antitoxin which prevents its mortality being as high as it used to be. A drop in the death rate to an average level of about 25 per cent. of what it was when antitoxin was introduced is something to be thankful for, but still better results seem to be within reach if only the antitoxin could be brought more quickly to the patient.

INTESTINO-VESICAL FISTULA

BY

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(With Special Plate)

The subject of intestino-vesical fistula does not appear to have attracted the attention of surgeons, perhaps because of the rarity of the condition. I have consulted several elderly general practitioners, long-standing in practice and keen observers, and also the honorary physician to a large hospital for incurable diseases, as to the number of cases of this condition that they have come across. None can recall a single case, even as a sequel to carcinoma of the rectum. The information thus gained confirms my conviction of the comparative infrequency of this type of fistula.

The monumental monograph of Harrison Cripps, *The Passage of Air and Faeces from the Urethra*, published as long ago as 1888, is probably still the best work available. This book analyses his collected series of sixty-three cases. He ascribes three causes of the condition: (a) trauma, (b) cancer, and (c) inflammation. He states that the fistulae were much more often due to inflammatory causes than to cancerous growths, and that therefore the prognosis by treatment was good. Two cases of his series were due to trauma, one being a sequel to labour lasting for four days, while in the second case the patient was impaled on a stake, which traversed the bladder and rectum. Cancer only caused the condition in nine instances. Cripps comments on how seldom a case of carcinoma of the rectum terminates in perforation into the bladder. An inflammatory condition was the cause of the perforation in forty-five cases out of sixty-three. His tabulation was:

Abscess	15	
Stricture	8	
Ulcer	4	27
	—	
Stone	2	
Exact nature not described	16	
	—	45

Cripps describes the situation of the fistulae in the following table:

Rectum	25
Colon	15
Small intestine	12
Colon and small intestine	5
Not stated	6
	—
	63