effect upon the *B. coli* in the intestine of injections of the toxins of *B. typhi*. When the toxins were administered in repeated small doses in such a manner as to produce immunity, he found the contents of the small intestine to be sterile, the *B. coli* normally present there having disappeared. When an overdose of typhoid products was administered in the course of such an immunisation experiment, there occurred a coli invasion, which resulted in localised abscesses from which the bacilli could be isolated. The two results of Sanarelli's work which have a direct bearing on our observations in the recent epidemic are (1) the effect of *B. coli* products in increasing the virulence of this typhoid bacillus, and (2) the effect of the injection of typhoid toxins in bringing about an invasion of *B. coli*. Sanarelli himself thinks it probable that autointoxication with products of intestinal fermentation is a factor in the causation of typhoid fever, and this suggestion brings the theory of the disease into line with his experimental results.

Chantemesse and Vidal carried out simultaneously a research on the same subject. They consider the typhoid bacillus isolated from the spleen as having slightly more virulence than was ascribed to it by Sanarelli. But they also had recourse to adjuvants to procure a really virulent bacillus. They used, among others, the products of the *B. coli*. The conclusion, they state without reservation, is that some factor besides the typhoid bacillus is concerned in the production of typhoid fever.¹⁵

CONCLUSION.

The observations on the epidemic which we have recorded in this paper afford further grounds for the application of the results of recent experimental work to the interpretation of the disease in the human subject. The attempts to reproduce in animals typhoid fever as a disease have been, on the whole, unsatisfactory, and, as we have seen, the difficulty is not a simple one. The first stage of the process must consist in obtaining bacilli of such virulence that they can invade the tissues of animals, and this difficulty has been overcome by the use of adjuvants. The further stages in the process of reproducing the disease are still unknown.

The object before us in this investigation has been to show that in patients there can be obtained from the serum indications of coli invasion during the process of typhoid fever. In other words, there is a large body of evidence to prove that Sanarelli's experimental results are directly applicable to typhoid disease in the human subject.

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ON THE VALUE OF THE TREATMENT OF DIPHTHERIA BY ANTITOXIN.

Being an Introduction to a Discussion held at the Hunterian Society.

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THE INTRODUCTION OF ANTITOXIN.

It is now upwards of four years since Roux at the Eighth International Congress of Hygiene at Buda-Pesth read his classic paper on the treatment of diphtheria by antitoxic serum. Before that occasion there had been furnished by certain German clinical observers no mean evidence that the treatment was of value, but it was Roux's paper that suddenly and prominently brought the method before the notice not only of the profession, but also of the public throughout the world, and for most countries the introduction of the antitoxic treatment dates from the latter part of 1894.

At first, even after the publication of Roux's paper, the new

remedy was looked on with much suspicion. So many specifics had from time to time been vaunted against the ravages of diphtheria, and though I will not go so far as to say that none of them were of service, yet certain it is that they never fulfilled a tithe of the promises made on their behalf; moreover, the tuberculin fiasco of 1890 was still fresh in the memory. But the previous terrible fatality of the disease, the stability of the experimental evidence upon which the new treatment was based, the openness with which the preparation of the serum was made known, and the weight attaching to the observations of one so eminent in science as Roux, compelled those who were concerned in the care of large numbers of diphtheria cases to give the method a thorough and unbiassed trial. Now, at the end of these four years, I think I can safely assert, without fear of contradiction, that all those who have employed the treatment in a sufficient number of cases have made up their minds regarding its value one way or the other, and that a large majority of these are agreed that all that was claimed for it has been fulfilled. There are a few who, even after more than a casual trial, are of the opposite way of thinking. Besides these two classes, there is another consisting of those who are, so to speak, of no way of thinking at all; they have either had few or no cases to treat, or they have not been able to procure the remedy, or they have not really troubled themselves about the question, but have preferred to go on with methods of treatment ancient but inefficient. The latter group, I fear, contains no small number of practitioners, judging by the evidence I daily encounter in the many children I see admitted to hospital in a hopeless condition who have not been afforded, while still there was time, the relief that antitoxin brings. I believe, moreover, that a study of such statistical facts as are available shows that the treatment has not been used to any marked extent outside hospitals.

EFFECT ON MORTALITY IN LONDON.

During the past three years there has been a lowering of the case mortality of diphtheria in London. The following table (Table I) shows to what extent this has occurred:

TABLE I.—Case Mortality of Diphtheria in London.

	1892.	1893.	1894.	1895.	1896.	1897.
Mortality per cent. of all notified cases	23.8	24.5	24.7	21.2	19.9	17.4
Mortality per cent. of notified cases admitted to Asylums Board hospitals	24.8	27.1	25.0	18.3	17.7	14.9
Mortality per cent. of notified cases not admitted	21.5	23.7	24.5	23.3	21.3	20.1
Percentage of notified cases admitted to hospitals	30.1	24.5	38.8	41.5	39.9	51.4

[The figures from which this table has been compiled are given in the annual reports of the Statistical Committee of the Metropolitan Asylums Board. They consist of the annual number of notifications, the annual number of registered deaths inside and outside the Board's hospitals, and the annual percentage of notified cases admitted to the hospitals. The actual number of notified cases admitted is not given except for the year 1897; but the number can be calculated pretty closely from the percentage. It must be understood that the table deals with cases admitted to hospitals as they are notified, and not as corrected for errors of diagnosis.]

The fatality (at its maximum 24.7 in 1894) fell to 17.4 in 1897; but it will be observed that this progressive diminution has been during the same time more marked among cases admitted to hospital than amongst those remaining outside, namely, from 25.0 to 14.9 in the one instance, and from 24.5 to 20.1 in the other. Usually the fatality of hospital-treated cases is higher than that of those not admitted to hospital. It was so for the years 1892, 1893, and 1894; in the latter year the difference was slight. But since 1894 this has not been the case. I think, therefore, it can be fairly claimed without laying undue stress upon the figures given in Table I, that some special factor has been at work to cause such marked changes, and knowing what I do of the value of the serum treatment, evidence of which I shall bring forward later, I am prepared to find this factor in antitoxin. It is impossible to say how many of the notified cases admitted to hospital have been treated with antitoxin; for the annual

reports of the Asylums Board give only the number of cases so treated amongst cases corrected for errors of diagnosis. It can only be said, as giving an indication of the extent to which the treatment has been carried out, that during November and December, 1894, a considerable number of such cases were treated; and that for 1895, 1896, and 1897 the percentage was 61.8, 66.2, and 80.2.

I think from these various figures I am justified in saying that the diminished fatality in London as a whole is due to the use of antitoxin; and, further, that the figures point to the conclusion that it is chiefly in hospitals that antitoxin is used; otherwise why has there not been an equal improvement in cases treated outside hospitals?

Daily experience in a hospital that has about 200 beds set aside for the treatment of diphtheria leads me to infer that very few cases are treated with antitoxin before admission. And this is not because the patients are sent to hospital early to get treatment. On the contrary, for the years 1894, 1895, and 1896 the percentage of diphtheria cases admitted to the Asylums Boards hospitals on or after the fourth day of illness was 59.2, 67.7, and 74.3. The difference in the fatality of cases according as they are treated in or outside hospitals would be very much more accentuated in favour of the hospitals were it not for the fact that a large proportion of the fatal cases are admitted at so late a stage of the disease as to be in a hopeless condition, and beyond the reach of any treatment whatsoever. In 1894, 1895, and 1896, 59.3, 67.6, and 74.4 per cent. respectively of the fatal cases were admitted on or after the fourth day of the illness.

All the evidence I have brought forward has been designed to show, and I think does show, that outside the hospitals, general or special, the antitoxin treatment of diphtheria is little practised. I believe that one of the objects of the discussion held here this evening is to point out the value of the treatment to such as have hitherto held aloof from it. I sincerely hope that this object may be attained; for, impressed as I am with the value of the remedy, it seems to me to be almost criminal that hundreds of children should be allowed to die every year in London for want of its timely application.

THE THERAPEUTIC VALUE OF ANTITOXIN.

I will now proceed to put before you the chief reasons which have led me to the conclusion that antitoxin is really a remedy of immense value in the treatment of diphtheria. My faith is based upon facts statistical and clinical. The former are more readily placed before an audience, the latter have a more personal appeal. Let us take the first great statistical fact—namely, the reduction in the case mortality. This has been crudely shown in Table I. But it becomes much more evident when we consider the hospital-treated cases after they have been corrected for errors of diagnosis. The case mortalities in the Asylums Board hospitals for the years 1892 to 1897 inclusive are as follows:

TABLE II.—Case Mortality of Diphtheria Cases in the Hospitals of the Metropolitan Asylums Board.

1892.	1893.	1894.	1895.	1896.	1897.
29.5	30.4	29.2	22.8	21.2	17.6

The reduction since 1894 is extremely marked. But it may be said that the later years of this series contained a larger proportion of adult patients, amongst whom diphtheria is less fatal than amongst children than the earlier years. While I think it could be shown that there is no weight in this objection, we will however allow it, and deal with the children under 5 years of age. For these, however, I cannot obtain the death-rates so accurately as for the whole of the cases. I give them as obtained by calculating the percentage of deaths on admissions (Table III):

TABLE III.—Case Mortality of Diphtheria in Children under 5 Years of Age in the Metropolitan Asylums Board Hospitals.

1892.	1893.	1894.	1895.	1896.	1897.
51.5	53.3	43.7	35.5	30.3	24.9

From Table III it appears that, beginning with 1894, there has been a marked diminution in the death rate, so that it is

about half what it used to be. Included amongst these cases are all those which are fatal from other diseases combined with or following diphtheria, but in no way resulting from it. To exclude these from the foregoing figures is impossible, the necessary data being wanting. I can, however, make the correction for the cases treated at the Eastern Hospital, with the following results, for the cases not treated with antitoxin in 1894, and all cases in 1896 and 1897 (Table IV):

TABLE IV.—Eastern Hospital. Case Mortality of Diphtheria in Children under 5, corrected for Deaths other than Diphtheria.

1894 (Jan. 1 to Oct. 22). Cases not treated with antitoxin	1896	1897
83 deaths—46.1 per cent.	264 „ 62 „ —23.4 „	401 „ 111 „ —27.6 „

(Of the 1896 cases 231 with 57 deaths, and of the 1897 cases 385 with 108 deaths were treated with antitoxin.)

To these figures, however, the following objections may be offered with more or less validity; indeed, to similar figures such objections have been offered—namely, that the age distribution of the cases may vary, even in so small a group relatively as that of the cases under 5, for amongst such children the younger the patient the higher the fatality. Or, again, a more forcible objection, that the 1896 or 1897 cases include a considerable proportion of “bacteriological” cases, cases, that is, in which the diagnosis has been made mostly on bacteriological grounds, such cases being usually of a mild character. It is not probable that either of these causes is sufficient to account for the differences observed. There is no selection of cases for admission; and with respect to the bacteriological difficulty, my experience has been that the cases which are set down as diphtheria because the characteristic bacilli have been found in the faucial lesion occur very largely among adults, certainly amongst patients over 5 years of age. Besides these objections we have further to remember that the proportion of laryngeal cases, and of cases admitted at a late stage of the disease, may have been so variable for these years as to account for part of the altered mortality-rate. In order to eliminate, as far as possible, all such errors as I have mentioned, I have decided to bring prominently before your notice a class of case amongst which they are less likely to arise, and against which, therefore, the foregoing objections cannot be urged with so much force. The class to which I refer is that of the laryngeal diphtheria cases.

STATISTICS OF LARYNGEAL DIPHTHERIA.

Now, in the first place, the laryngeal cases constitute a class concerning which there can be very little, if any, dispute on the score of diagnosis. It is exceedingly unlikely that there will be included amongst them any appreciable number of cases of laryngeal obstruction which are included solely because a bacteriological examination has revealed the presence of the characteristic organism. I take it that if a child presenting symptoms, however slight, of laryngeal obstruction is found to have exudation, however limited, upon its tonsils or soft palate, then that child is the subject of diphtheria. It is, at any rate, generally admitted that the exceptions to this rule are very unusual. Further, a laryngeal case of diphtheria is always to be looked upon with concern because of the suffering that even slight obstruction to respiration entails, and because of the frequency with which a fatal issue results. Lastly, the vast majority of the patients attacked by this form of diphtheria are children under 10 years of age, and a large proportion are under 5. Therefore, from the point of view of diagnosis, fatality, and age, the laryngeal cases constitute a class admirably suited for exhibiting the results of any particular line of treatment.

Now, what has been the fatality of laryngeal diphtheria during past years? Statistics of laryngeal cases which include the cases not tracheotomised are not so numerous as one would wish, and those giving separately the cases not operated upon are still less common. I have collected from the sources indicated in the tables which follow statistics showing the recovery-rate—first, in cases of laryngeal diphtheria, both tracheotomised and not; secondly, in such cases as have not been operated upon; and thirdly, in cases tracheotomised.

CASES NOT TREATED WITH ANTITOXIN.

TABLE V.—Cases of Laryngeal Diphtheria, whether operated on or not.

Authority.	Number of Cases.	Number of Recoveries.	Recovery-rate per Cent.
Sanné (Hôpital Sainte-Eugénie, 1854-75) ¹	2,809	831*	29.5
Asylums Board Hospitals, 1894 ²	466	177	38.0
	3,275	1,008	33.8

* Including 118 discharged from hospital uncured.

TABLE VI.—Cases of Laryngeal Diphtheria not operated upon.

Authority.	Number of Cases.	Number of Recoveries.	Recovery-rate per Cent.
Sanné (Hôpital Sainte-Eugénie, 1854-75) ¹	497	232*	46.6
Asylums Board Hospitals, 1894 ²	205	100	48.7
Henoch ³	43	3	6.9
	745	335	44.9

* Including 23 discharged from hospital uncured.

TABLE VII.—Cases of Laryngeal Diphtheria Tracheotomised.

Authority.	Number of Cases.	Number of Recoveries.	Recovery-rate per Cent.
Sanné (Hôpital des Enfants Malades, 1851-75)	2,351	690*	29.3
Ditto (Hôpital Sainte-Eugénie) ⁴	2,312	599†	25.4
V. Hirsch ⁵	1,654	517	31.2
Antitoxin Committee of Clinical Society ⁶	1,531	434	28.3
Asylums Board Hospitals (1889-93) ⁷	323	104	32.1
Ditto (1894) ⁸	261	77	29.5
Clubbe (Sydney Children's Hospital) ⁹	199	64	32.0
Guersant ¹⁰	156	28	18.0
Eastern Hospital (1892-93) ...	140	30	21.4
	8,927	2,543	28.4

* Including 76 discharged from hospital uncured.

† Including 90 discharged from hospital uncured.

[No intubation cases are included in these tables.]

Of 3,275 cases of laryngeal diphtheria, whether operated upon or not, 1,008 recovered, or 33.8 per cent. Of 745 cases not operated upon, 335, or 44.9 per cent., recovered.

Only 3 of Henoch's 43 cases recovered; if this series is deducted as being exceptionally severe, the rate of recovery in this class becomes 47.2.

Of the tracheotomies a large body of statistics is forthcoming. Of 8,927 tracheotomies 2,543 recovered, or 28.4 per cent. Besides these figures we have other information concerning the results of tracheotomy in preantitoxin days. Roux, in the paper already referred to,¹¹ states that at the Hôpital des Enfants Malades during the four years immediately preceding the introduction of the antitoxin treatment, the recovery-rate was 27 per cent. Cadet de Gassicourt¹² says that at the Hôpital Trousseau from 1866 to 1878 the recovery was 20.8 per cent. At the same hospital, during the months May to July, 1894,¹³ the recovery-rate was only 14 per cent., the cases not being treated with antitoxin. Welch,¹⁴ who collected a large number of statistics, writes as follows: "The percentage of fatality from tracheotomy in diphtheria, given by Monti from a total of 12,376 cases up to 1887 is 73.3 per cent., that is a recovery-rate of 26.7." Henoch¹⁵ states that of 341 tracheotomies under his care scarcely 15 per cent. recovered.

From all these figures it will be observed that, as a rule, under 30 per cent. of the cases recovered. Trousseau¹⁶ states that of his own cases about a fourth recovered; and he

thought that for hospital practice one-fifth was a large proportion to be cured. He looked for a recovery-rate of 50 per cent. in private practice. I think statistics go to show that since Trousseau's day there has been some improvement in the results in hospital practice, even before the introduction of antitoxin, due to improvements partly in surgical treatment, partly in nursing and the hygienic arrangements of hospital wards; but I very much doubt whether apart from antitoxin his hopes respecting the results in private practice have ever been realised.

It will be observed that the recovery-rate of the cases not operated upon is, as a rule, higher than that of the tracheotomies. The interpretation of this fact is probably that amongst laryngeal cases those in which the symptoms of obstruction to respiration are urgent are operated upon, and that the fatal cases in this group consist chiefly of toxic cases in which laryngeal symptoms are slight or obscured.

We will now examine the statistics of these different classes since the introduction of the antitoxin treatment. I have arranged them in tables, as with the preantitoxin cases:

CASES TREATED WITH ANTITOXIN.

TABLE VIII.—Cases of Laryngeal Diphtheria, whether operated upon or not.

Authority.	Number of Cases.	Number of Recoveries.	Recovery-rate per Cent.
American Pediatric Society ¹⁷ ...	1,704	1,344	78.8
Asylums Board Hospitals ¹³ ...	1,422	944	66.3
Belin ¹⁹ , Strassburg	181	137	75.6
Roux ²⁰	131	65	49.6
Zuppinger, ²¹ Vienna	48	32	66.6
	3,486	2,522	72.3

TABLE IX.—Cases of Laryngeal Diphtheria not operated upon.

Authority.	Number of Cases.	Number of Recoveries.	Recovery-rate per Cent.
American Pediatric Society ¹⁷ ...	1,030	852	82.8
Asylums Board Hospitals ¹³ ...	742	560	75.4
Belin ¹⁹	49	49	100.0
Roux ²⁰	10	10	100.0
	1,831	1,471	80.3

TABLE X.—Cases of Laryngeal Diphtheria Tracheotomised.

Authority.	Number of Cases.	Number of Recoveries.	Recovery-rate per Cent.
Asylums Board Hospitals ¹⁸ ...	680	384	56.4
American Pediatric Society ¹⁷ ...	668	486	72.7
Collected by Welch from 39 reports ¹⁴	518	313	60.4
Belin ¹⁹	132	88	66.6
Clubbe, ⁹ Sydney	129	80	62.0
Roux ²⁰	121	65	53.7
University College Hospital ²² ...	72	53	73.6
Cuno, ²³ Frankfurt	54	37	68.4
	2,374	1,506	63.4

[No intubation cases are included in these tables.]

Of 3,486 cases of laryngeal diphtheria, including both those tracheotomised and those not, 2,522 recovered, or 72.3 per cent. Of 1,831 cases of laryngeal diphtheria not tracheotomised, 1,471, or 80.3 per cent., recovered; while of 2,374 tracheotomies, 1,506, or 63.4 per cent., were cured. All these cases were treated with antitoxin. It will be observed that, as in the preantitoxin cases, the recovery-rate of the cases not operated upon is greater than that of the tracheotomies, probably for similar reasons.

CONCLUSIONS AS TO ANTITOXIN IN LARYNGEAL DIPHTHERIA.

To give a brief summary of these statistics: Whereas in the preantitoxin days of 100 tracheotomies you could not expect to save more than 29, now you can expect to save no fewer than 53; of laryngeal cases not operated upon, in those days not more than 48, now not fewer than 75; of all cases, then not more than 34, now not fewer than 49. Further, we have a good chance of saving nowadays a much larger percentage of cases than the numbers I have just given. It is quite true that in former times without the use of antitoxin some very good results were obtained in tracheotomy cases. Sanné quotes a series of 87 cases from Geneva with 38 recoveries, or 43 per cent.; and at the North Western Hospital of the Asylums Board for 1893 there were 78 cases with 34 recoveries, or 43.5 per cent. Welch quotes 47 cases reported by Sonnenberg, with a recovery-rate of 62 per cent.; Stintzing as reporting a recovery-rate of 51 per cent., and Withauer one of 75 per cent. The number of cases, however, in these last two instances is not given in Welch's paper; and even these authors state that antitoxin produced an improvement upon their previous success. But these rates were all uncommon and do not in any way vitiate the conclusions drawn from the figures I have given.

I think I am fully justified in claiming for antitoxin the great reduction in mortality amongst cases of laryngeal diphtheria that these figures reveal. I know of no other agent that can have brought about this result; if there be such it is for the adverse critic to point it out.

TRACHEOTOMY.

The influence of the antitoxin treatment can be demonstrated by means of the laryngeal cases in other ways than by mortality statistics. It has been stated by many writers that the occasion for the operation of tracheotomy has been rendered very much less frequent; and though I believe this really to be the case it is not possible to prove it by the statistics I have produced above. It is quite possible that all the laryngeal cases admitted during a definite and sufficiently lengthy period to any given hospital might already be so far advanced as to require tracheotomy; in which case it could be said that, compared with previous years, the proportion of cases requiring operation was certainly not less and most likely more than before. This was so indeed with the cases treated in the Asylums Board hospitals in 1897. For that year the percentage of laryngeal cases requiring tracheotomy was 53.7. In 1896 the percentage was 41. In 1894 (the non-antitoxin year) it was 56. Thus though there was apparently a diminished necessity for tracheotomy in 1896, in 1897 the operation was called for to almost the same extent relatively as in 1894.

What we really require to know is the number of times in which the larynx becomes involved after the injection of antitoxin in a series of cases all of which are treated with antitoxin. The general consensus of opinion is that it is much more rare for the diphtherial inflammation to spread to the larynx in cases treated with antitoxin than it used to be, and still is, in cases not so treated. Figures illustrative of this fact were given in the reports on the antitoxin treatment drawn up by the medical superintendents of the Asylums Board hospitals. During 1894, of 3,042 consecutive cases not treated with antitoxin, 116, or 3.8 per cent., developed laryngeal symptoms after admission; in 1895 the number of similar cases was 18 in 2,965, or 0.6 per cent.; in 1896 it was 16 in 3,300, or 0.4 per cent.; 61.8 per cent. of the 1895 and 66.6 per cent. of the 1896 cases were treated with antitoxin on admission to hospital. Further evidence on this point was obtained by a study of the cases of diphtheria arising amongst the scarlet fever convalescents at the various hospitals during 1896. Of 412 cases in which there were no laryngeal symptoms present when the serum was injected, in 5 only the larynx became invaded, or 1.2 per cent.; while of 236 cases which were not treated with serum, at any rate till after the onset of croup, in 38 at least this symptom arose, or 16.6 per cent. From my own experience I can certainly confirm what these figures tell. For the past three years in the Eastern Hospital we have had almost no cases of laryngeal obstruction in which the symptoms have arisen after admission. Antitoxin is injected immediately after admission.

The recognition of this power of checking the disease is

exceedingly important. If once the larynx is attacked there is always the chance of having to resort to operative measures which bring their own peculiar dangers. I believe that if only in every case of faucial diphtheria antitoxin were administered sufficiently early the number of laryngeal cases would be reduced to those in which either croup was the first sign of the disease or the larynx was the part first attacked.

EXTENSION OF MEMBRANE TO BRONCHI.

One other fact I will mention in connection with the laryngeal cases which supports the conclusion that antitoxin arrests the membranous formation. I have made an analysis of the causes of death in three series of consecutive cases. The first consists of 131 fatal cases, not treated with antitoxin in 1894; the other two, of 103 and 171 treated with antitoxin in 1896 and 1897 respectively. There are two ways in which diphtheria of the respiratory tract may prove fatal—the one by extension of the membrane to the lungs, leading to suffocation, the other by the setting up of broncho-pneumonia. Of the non-antitoxin cases, 22 died of extension of membrane along the respiratory tract and 21 of broncho-pneumonia; for the antitoxin series the numbers were 3 and 5 of extension of membrane and 4 and 9 of broncho-pneumonia. The figures are given in the following table:

TABLE XI.

In 1894	16.7 per cent. of the fatal cases, and 4.9 per cent. of the total cases died of extension of membrane to the lungs.
In 1896	2.9 per cent. of the fatal cases, and 0.4 per cent. of the total cases died of extension of membrane to the lungs.
In 1897	2.9 per cent. of the fatal cases, and 0.4 per cent. of the total cases died of extension of membrane to the lungs.
In 1894	16.0 per cent. of the fatal cases, and 4.6 per cent. of the total cases died of broncho-pneumonia.
In 1896	3.8 per cent. of the fatal cases, and 0.6 per cent. of the total cases died of broncho-pneumonia.
In 1897	5.2 per cent. of the fatal cases, and 0.8 per cent. of the total cases died of broncho-pneumonia.

Seven of the 8 antitoxin cases of 1896 and 1897 that were fatal from extension of membrane, presented symptoms of this extension before the antitoxin was given. A large proportion of the broncho-pneumonia cases were cases of laryngeal diphtheria, but not all of them.

From these figures it appears that under the antitoxin treatment there has been a considerable reduction in the number of cases fatal from the most painful modes of death in diphtheria.

VARYING RESULTS IN DIFFERENT HOSPITALS.

One word more before I pass from the laryngeal cases. Some critics, and those by no means hostile, still continue to wonder how it is that comparing one set of results with others, say, for example, the tracheotomy results at different hospitals, there is still so much difference between them. For instance, the mortality of the tracheotomy cases varied at the different hospitals of the Asylums Board in 1897 from 31 to 67 per cent., the mortality of all the cases being 40. The causes of the variation in mortality can hardly be shown in a table. It is doubtless due to the variations in the number of toxic cases attended by complications, and of patients admitted late in the disease. But this variation it should be well known was present in the preantitoxin days. At the same hospitals in 1894 the mortalities ranged from 59 to 90 per cent. And as regards hospital statistics, as long as the conditions, especially with respect to the admission of patients, continue as they are, we must still expect this variation. But the difference between the present and preantitoxin times is that whereas then the percentages of recoveries lay between 45 and 10, now they lie between 70 and 30.

(To be continued.)

AN INTERNATIONAL TEMPERANCE CONGRESS.—The International Congress for the Prevention of the Abuse of Alcoholic Drinks will hold its seventh meeting this year in Paris, April 4th to the 9th, Dr. Th. Roussel being the Honorary, and Dr. Legrain the Acting, President. Communications should be addressed to the General Secretary of the Congress, Dr. Boissier, 18, Rue de Condé, Paris (Librairie Nathan).