

DIPHTHERIA AND OTHER ACUTE INFLAMMATIONS
OF THE NOSE AND THROAT, WITH SPECIAL REFER-
ENCE TO RECENT METHODS OF DIAGNOSIS AND
TREATMENT.

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AT the present time, when so much attention is being paid to the causation and treatment of one special acute affection of the upper respiratory tract, it may not be inopportune to offer some remarks upon this and other acute inflammatory affections of this region. In this paper I wish, in the first place, to refer to the difficulties which at present exist in the classification of these diseases; then to the influence which bacteriological investigation is likely to have; and, lastly, to the necessity for greater facilities for such investigations with the view to better classification and treatment.

A glance at any of our ordinary text-books on diseases of the nose and throat will show the imperfect classifications at present in use. Each author attempts to group the cases which come before him according to clinical evidence, and in consequence great confusion exists. For example, many catarrhs in the nose, clearly arising from different causes, are classed together as "acute rhinitis." The presence of a discharge gives rise to the term "purulent rhinitis," while a membrane forming on the surface suggests the name of "rhinitis fibrinosa" or "croupous rhinitis," and so on. Again, in the region of the tonsils, Wagner¹ describes five different forms of acute inflammation, while Mackenzie² contents himself with two. Bosworth³ describes as croupous what is generally known as follicular tonsillitis, and attempts to classify such conditions according to the false membrane present. Other examples might be quoted in the region of the pharynx and larynx, but it need hardly be pointed out that they do not hold good in view of the recent advances in bacteriological science. False membrane, we know, may be produced by agents which cause severe inflammation and death of the epithelial or other structures. Various micro-organisms possess this power, and Roux and Yersin have described cases of primary pseudo-membranous anginas which were not due to the presence of the Klebs-Loeffler bacillus. The presence of fibrin in the exudation may be considered more an index of the severity of the influence at work

than an indication of any specific agent. Although we are not yet in a position to give a definite opinion upon the various causes of catarrhs, we know sufficient to show that many forms of acute inflammation of the upper respiratory tract are due to different causes. For example, the application of certain chemical agents to the Schneiderian membrane may produce a catarrh, and the injection of a few drops of blood from a patient suffering from measles will produce the disease in another, and an irritation of a similar nature in the same mucous membrane. It is quite evident, therefore, that some agents placed upon the membrane from without, and others brought to it from within, will produce similar indications of catarrh. Fortunately, most so-called specific catarrhs in the nose and throat are attended with other signs rendering the diagnosis comparatively easy, but an acute inflammation of the upper respiratory tract is often one of the first indications of the onset of a specific affection. In most cases the local signs are at first insufficient to indicate the precise nature of the affection, and clinical observers know that in mild cases of fever the proofs may be altogether absent. In consequence, a large number of people are mildly affected with scarlatina, measles, or diphtheria, and the sore throat from which they suffer shows nothing to distinguish it from what is termed a simple catarrh. For the most part, our text-books, when speaking of etiology, refer to such agents as air, water, food, cold, damp, age, sex, occupation, diatheses, or, it may be, specific influences supposed to be characteristic of particular infectious fevers. A careful analysis of these shows how difficult it is to understand the exact influence exercised by each. Age and occupation may be quoted in this way, because the one often infers the other. Occupation may suggest a tendency to a particular affection, but many so occupied will not be so affected. The term "cold" does not mean absolute cold. Food and water may produce various forms of disease, but more because they are vehicles for the transmission of other agents than from any inherent defects. Undoubtedly the greatest advances of late have been made in the region of bacteriological science, because the life-history of the pathogenic organisms, whether studied in or outside of the body, often explains what would be otherwise incomprehensible. The study of etiology, however, did not begin with bacteriology, nor will it end there. Every one engaged in the study of diseases of the throat has numerous examples placed before him of considerable irritation occurring in this region where imperfectly heated and moistened air has been, under

certain conditions, brought to bear on the delicate mucous membrane of the parts below. A careful study of the physiological processes taking place in the nostrils will show how important it is that the air passing to the lower respiratory tract should be heated and moistened as it passes over the region of the turbinated bodies and mucous membrane in this cavity; and a considerable proportion of cases of irritation of the membrane lining the respiratory tract may be attributed to causes quite apart from those of bacteriological origin. Further, comparatively slight causes lead to other changes and sequelæ of a serious nature, which may be traced in definite order and sequence. A slight obstruction from swelling of the turbinated tissue will produce a different atmospheric pressure behind, and so produce hyperæmia of the parts. This means over-nutrition, and over-nutrition leads to over-growth of tissue. If this process be carried on sufficiently far, nasal stenosis will result, either in the mucous membrane itself or the lymphoid structures of the naso-pharynx, and so a whole series of sequelæ of a detrimental nature may be produced in the larynx, trachea, lungs, or even, in children, in the hard walls of the chest itself.

Shortly after the discovery of the Klebs-Loeffler bacillus, several years ago, I made a series of experiments upon the bacteriological examinations of these cavities, and was fortunate enough to have valuable advice and training from Dr. Edington, then of the Bacteriological Laboratory at Edinburgh University. The first series of observations lay in the direction of the study of the forms found in the upper respiratory tract in health as well as in disease. The results have shown, however, that difficulties arise when the subject is studied from this standpoint. Firstly, pathogenic forms may be found in the throat of persons in apparently good health; secondly, Raynaud, Pasteur, Roux, and Fraenkel have shown that micro-organisms very frequently found in the buccal cavity, and seemingly harmless there, do not appear to be so when injected into the subcutaneous tissues of animals; thirdly, the variety, as might be expected, is endless; fourthly, as we know, many of the known diseases suspected to be due to micro-organisms have not yet been traced to any known micro-organic source. Nevertheless, the study of the various forms met with in these cavities, particularly during health, is of great value in diagnosis when one is searching for a specific organism. With this view I have appended an amended list, published elsewhere, of micro-organisms frequently found in the examination of the upper respiratory

tract. It is evident that, in the present state of our knowledge, Koch's method of investigation is the only one likely to prove successful—that is to find, if possible, the constant presence of a particular organism in a particular affection, and afterwards, by his well-known methods, to establish the relationship between cause and effect by inoculation and cultivation. Notwithstanding the valuable results which have been obtained by many observers in different medical schools, it cannot be said that our range of knowledge is at present very extensive. Doubtless many acute inflammations may be traced to specific causes, a common one being in association with tubercle. The greatest part of the work has been limited to affections of the tract in which suppuration has taken place, or where a membrane of some kind or another has been formed on its surface. In attempting to distinguish which forms of micro-organisms are present in the acute affections going on to suppuration, I made a series of observations upon the nasal discharges, and, secondly, upon cases of suppuration taking place in the accessory sinuses—notably in the antrum of Highmore. In nearly all these cases it was easy to trace the presence of the ordinary micro-organisms of suppuration, such as streptococci and staphylococci. Their frequency was sufficient to suggest a causal effect; but it must be remembered that, hampered as we are by anti-vivisection laws in this country, it is impossible in every case to make inoculations after the different forms have been isolated by cultivation. Further, in a number of cases of recurrent erysipelas of the nose and face, I was able to trace the source of mischief lying latent in the antrum of Highmore. These results were published in the *Journal of Laryngology* for July, 1892.

In another series of observations the acute inflammations of the tonsils were considered, and the most commonly observed organisms were streptococci and staphylococci; in some instances other forms, such as the diplococci and pneumococci were observed. It need hardly be pointed out, however, that in the great majority of cases other organisms were present, particularly those which are found in the mouth under ordinary conditions. In this connection, it is important to note that such an authority as Miller⁴ of Berlin has pointed out that, in the pulps of the teeth of 250 persons examined, the suppuration was due to mixed organisms, cocci and rods being present with fairly equal consistency. A suppurative condition appears to be produced by the presence of these round-celled organisms, though the typical pyogenic forms—

the streptococci and staphylococci—are rarely to be found in the pus from these cavities. He states that these cocci may form a group of closely allied species, but they have a distinct pathogenic action, proved by injection into mice.

Apart from experiments upon animals, a good deal of information can often be obtained by clinical observation. We know that auto-infection may take place, and we can often trace the progress of events from point to point. For example, I had more than one case in the Glasgow Royal Infirmary where an apparently simple tonsillitis passed, as is not uncommon in such cases, to the glands of the neck, but afterwards to those of the mediastinum, and then to more distant organs of the body. The disturbance was so severe as to suggest a typhoid condition, lasting for weeks, and with great danger to life. Again, it is no uncommon thing to trace the suppurative processes from the antrum of Highmore to the naso-pharyngeal membrane, then to the Eustachian tube, middle ear, and mastoid region. Pleurisy, often purulent, and orchitis with suppuration, have been observed. Further, not only do we see that such acute affections, particularly in the region of the tonsils, may invade different parts of the organism, but they are capable of setting up serious constitutional mischief. Cardiac inflammations, endocardial and pericardial, may be noticed during the course of the disease; skin eruptions and albuminuria likewise; and some suggest that paralysis may be seen as a sequela. This last statement is doubtful, and has been vigorously contested, as pointed out by Sallard.⁵ Some clinical observers have mentioned paralysis following sore throat of the non-diphtheritic nature; but this is one of the many points which can only be cleared up by extensive bacteriological diagnosis.

Passing to the consideration of acute affections like diphtheria, in which a membranous exudation forms one of the characteristic features of the disease, I had no difficulty in demonstrating, in a considerable number of cases, the presence of an organism corresponding in every way to the Klebs-Loeffler bacillus. In July, 1892, I⁶ published a paper showing that, in 39 per cent of cases of diphtheria examined, this organism could be detected by microscopic examination and cultivation. This percentage is by no means as high as that of many observers; but it must be remembered that in consulting practice one is often called to the cases where, for many reasons, it is not possible to get the same opportunity of obtaining these organisms as in the earlier stages of the disease, and, moreover, the membranes may have been considerably

acted upon by antiseptics and other agents. Since that date my percentages have been very much higher; but it is by no means uncommon to find a case typical of diphtheria where the vast majority of organisms present are of the round form, in every way corresponding to the streptococci to which we have been referring. On the other hand, organisms which are now grouped as the pseudo-bacillus of diphtheria were often found, particularly in mild cases, and frequently in exudations of the nose, which might clinically be called rhinitis fibrinosa.

In collecting a series of statistics the following have come under my notice:—Beck⁷ found them 32 times in 32 cases; Tangl,⁸ 18 in 18; Escherich,⁹ 15 in 15; Baginsky,¹⁰ 118 in 154; Ritter,¹¹ 29 in 82; Parks,¹² 73 in 104; Phillips,¹³ 332 in 376; and Park and Beebe¹⁴ found that in 5,611 cases of suspected diphtheria Loeffler's bacillus was present in 3255. In view of the important bacteriological questions before the profession at present the above mentioned figures deserve careful consideration. Firstly, the results would show that the Klebs-Loeffler bacillus is frequently found in cases of suspected diphtheria. Secondly, no one can doubt that inoculation in animals will produce a pathological process. Again, Roux and Yersin produced typical paralysis by injecting the products alone. These facts seem proved beyond doubt. Nevertheless one is inclined to ask the question, are we justified at present in accepting the view that the presence of the Klebs-Loeffler bacillus means that the case is one of diphtheria, and its absence that it is not? I do not think we are yet in a position to take such a view of the case. It is evident that in a certain number of cases of suspected diphtheria it is not found. Moreover, we know, as I have said above, that streptococci may of themselves produce the most serious constitutional effects, and they are often present, and seemingly actively present, in cases of diphtheria. In my own practice, I have noticed that where the streptococci seemed to be actively engaged, and where the Klebs-Loeffler bacillus was also present in large numbers, the cases were very serious. This, like every other rule, is not without exception. Roux and Yersin have maintained that a combination of the two organisms increases the virulence of the latter, but this view has been disputed by Messrs. Washbourn¹⁵, Goodall, and Card.

Dr. Hansemann,¹⁶ assistant to Professor Virchow at the Pathological Institute, Berlin, on 28th November, submitted the whole question to a searching criticism. He first of all devoted himself to the anatomical aspect of the question, and

said that the Loeffler bacillus might be found in 75 per cent of all cases examined; that it was never found alone, but always in association with other virulent bacteria such as streptococci and staphylococci; that the organisms might be found in the mouths of healthy persons, and it could be found in the mouths of those who had recovered from the disease for weeks afterwards, and where there had been no relapse. He next criticised the animal experiments, and maintained that subcutaneous injections might set up serious infiltrations and hyperæmia of the kidneys; that on uninjured mucous membranes the bacillus often produced no effect. It might of course produce fibrous exudation on an injured mucous membrane, but the same results could be produced by chemicals and other micro-organisms. Diphtheria, he said, set up in guinea-pigs with the Loeffler bacillus was not by any means identical with Bretonneau's diphtheria of the human subject. The guinea-pig was susceptible to Loeffler's bacillus, but never to spontaneous diphtheria. Bacteriologists maintain that while Loeffler's bacillus was present we had diphtheria; where it was absent it was not diphtheria. He very properly pointed out that on this basis angina and conjunctivitis were diphtheritic, but that rhinitis fibrinosa, a comparatively harmless disease, must be diphtheritic, for the bacillus was constantly found there.

It is evident that with so many doubtful questions still to be settled, the only hope we have of arriving at definite conclusions is to have systematic and careful examination by experts at our great hospitals, but I think something more is required. Three years ago, when reading a paper at Nottingham on the etiology of catarrh, I suggested that bacteriological stations ought to be established throughout the country. About three months ago Mr. Lennox Browne¹⁷ suggested that such facilities ought to be afforded our practitioners, and recommended that a requisition be sent to the Local Government Board bearing upon the question. This has been done, and I have added a copy of it in the Appendix. The time may come when practitioners will be trained in our colleges to detect the presence of a specific organism in a particular disease, and then such facilities may not be required. If ever such a time should arrive, it will be after a great many of the questions now in dispute have been settled. Many practitioners have very properly acquired the knowledge for the detection of Koch's bacillus in tubercle, and doubtless it would be a comparatively easy matter to train men to detect the Klebs-Loeffler bacillus both by examination and cultiva-

tion. My own opinion is, however, that this is not enough, because there are many questions of the most serious nature yet to be settled about the exact causes and the relations between the presence of one or more organisms, and the effects produced in a particular affection. We can only look for exact statistics and results at the hands of experts. Moreover, many practitioners have neither the time nor knowledge, and an arrangement by which a reliable opinion could be quickly obtained would be of the greatest service to them. In New York such a system has been found to work admirably, and the first report has been published by their inspectors of bacteriology, Drs. Park and Beebe.¹⁸ These small boxes can be obtained at the different chemists containing culture tubes, swabs, and directions to the physician. A report can be obtained in the minimum number of hours necessary to examine and cultivate the specimen sent. From 4th May, 1893, till 4th May, 1894, 5,611 cases of suspected diphtheria were subjected to bacteriological examination, and of these 3,255 were shown to have the Klebs-Loeffler bacillus present. In 1,540 cases this bacillus was absent, and in 816 the diagnosis was considered doubtful, as the cultures were made after the fourth day of the disease or in doubtful culture media. Other important questions are considered such as sex, age, and mortality in true and pseudo-diphtheria, 1·7 being the mortality in the latter, as contrasted with 27 per cent in the former. Information is also given about the proportion of cases of suspected diphtheria which proved, after bacteriological examination, to be true diphtheria. The best methods of preparing media, the methods of examining cultures, the growth upon various media and inoculations in animals, are all dealt with in this very practical report. Several of these deserve more careful inspection, and in the Appendix to this paper I have placed two tables bearing upon the virulence of bacilli found in twenty cases of throat inflammation of such a character as to arouse a suspicion of the existence of diphtheria, and upon the length of time during which the diphtheric bacillus persists in the throat after the disappearance of the membrane and its virulence in convalescent cases. Interesting results have also been obtained of a practical nature. For example, in considering the presence of the Loeffler bacillus in healthy persons who have been subject to the risk of infection, the authors point out that in forty-eight children, in fourteen different families, typical bacilli were found in 50 per cent of the cases, and 40 per cent of the children were afterwards

seized with the disease. These and many other questions of practical value are discussed in this excellent report, and a perusal of it will show at once how much valuable information could be obtained were similar laboratories established in the great centres of activity in this and other countries.

That the study of the etiology of the acute affections of the upper respiratory tract will have a powerful influence upon treatment, no one can doubt. Our sanitary authorities are vigorously engaged in discovering the causes and various channels by which infection may be carried. Further, isolation in the diseases which are considered infectious is being strongly insisted upon. I do not think, however, that this has been sufficiently carried out, because a considerable number of conditions of the pharynx and larynx, often termed membranous, are not yet classed under the infectious diseases. It appears to me that, if we are to prevent the spread of disease—especially in children, and more particularly in school children—isolation at the very earliest state, in all cases of suspected acute inflammation of the throat, should be insisted upon, and an early diagnosis made. But in considering the prophylaxis of disease, there is another serious aspect of the question. Professor Macewen has shown in his great work the dangers to persons with chronic suppurative discharges in the region of the ear. No one engaged in the study of diseases of the nose and throat can fail to be impressed with the constant recurrence of and serious effects arising from latent mischief in the accessory cavities and crypts of the tonsils. That they should be dealt with surgically, and in the most thorough manner, so as to obtain restoration to healthy functions, is the only sensible view to adopt. And in this connection we may take a step further, and refer to the dangers which a patient with enlarged tonsils and post-nasal adenoid growth is bound to encounter if seized with an acute membranous condition of the fauces. Dr. Woodhead has very properly pointed out that the organisms in this case are really on the surface of the body, producing, as it were, outside of the body, toxin which causes the disastrous constitutional effects; but while that is true, one can easily see how difficult it is to apply any remedy with success to the surface of a diseased tonsil full of crypts, the mouths of which are so swollen as to prevent the access of an antiseptic agent to the deeper parts. The question, therefore, of the advisability of dealing with this, even in the acute stage, is one well worthy of consideration, and in this respect, the paper which Dr. Watson published

in the *Glasgow Medical Journal* last year deserves attention. Theoretically, at least, bacteriological investigation goes far to prove that the application of local antiseptic treatment should be persevered in, and the indications are, of course, in the direction of the remedies best suited for the destruction of the active agents in the production of the disease. The tendency of modern thought is to try, as men have all along been trying, to find some constitutional specific whereby those struck down with acute infections may be helped, and this brings us to the question of serotherapy.

Ever since the remarkable experiments of Fraenkel,¹⁹ Behring,²⁰ and Kitasato,²¹ showing that immunity could be obtained in certain animals by the inoculation either of culture fluids (heated to 60° or 70° C.) or immunised blood serum, a considerable amount of attention has been paid to the subject. Behring's recent work on the history of diphtheria has naturally attracted most attention, but it must be remembered that Roux is entitled to great credit, not only because of his own work and that with Yersin, but also for the methods of production of the serum and the rules for its administration. Klein, in this country, is also doing admirable work, and it is to be hoped reliable statistics will soon be at our disposal, especially from those who have been fortunate enough in hospital practice to obtain supplies of the remedy.

Already statistics are being brought forward, and Messrs. Washburn,¹⁵ Goodall, and Card have given the results in 80 cases treated by this method. Owing to the difficulty in getting supplies, comparatively few in this country have as yet had an opportunity of testing the remedy, and so, for the most part, our information is derived from Continental observers. For experimental purposes, I had, some time ago, a limited supply sent to me. Three different kinds are now to be had—the first, Ahronson's, the second, Burroughs, Wellcome & Co.'s, and the third is that of Lucius & Brüning. The principal of the last-mentioned laboratory is Dr. Libbertz, under the control of Professors Behring and Erlich. Meantime, I may be allowed to point out that the remedy as supplied by the different chemists seems to vary in several respects. The last two preparations mentioned require a much larger quantity, and this is, to a certain extent, unfortunate, as it necessitates more trouble and a larger syringe. Messrs. Down Brothers have produced one on the same lines as Koch's for tuberculin, and capable of holding 20 c.c. Lucius & Brüning give their preparation in three different strengths—No. 1

contains 600 antitoxin normal units; No. 2, 1,000; and No. 3, 1,500. A case of diphtheria in an advanced stage requires several injections of single doses of No. 1, or the contents of No. 2 or No. 3 in the more concentrated forms. They recommend the half-bottle No. 1 as a prophylactic for children and adults. Injections are recommended to be placed in parts of the body where the skin is loose, and the parts upon which the patient lies should be avoided. I need hardly point out also that special antiseptic care is to be observed in cleaning the different parts of the syringe. I have used these different forms of the remedy, but prefer to reserve any remarks upon the general effects until I have had more experience of its actions. I have, however, tried to observe carefully any changes in the local condition after injection, with a view to confirming one great advantage claimed for it by Dr. Moizard²²—namely, the less frequent need of operation, owing to shrivelling and clearing away of the membrane. In one case, where the remedy had been injected previously by the medical attendant, I had to perform tracheotomy, as no beneficial results had been obtained. The medical attendant in charge of such cases has a better chance of noting this result, and I am pleased that in some of these the reports have been somewhat encouraging. I am favoured by one such report from Dr. Alexander Morton, of Glasgow, who had two cases in which he used two injections of 15 minims of Ahronson's fluid, and the results were prompt and satisfactory. The membrane, in both cases, was acted upon in the manner claimed for it by the discoverer. Dr. Simmers, of Crail, using the same preparation in a few cases, had a similarly good result. Dr. Gougeunheim, of Paris, writes me that, from his own observations and that of others in Paris, he looks upon the discovery as of great importance. Others, both at home and on the Continent, have been less favourably impressed with the remedy. Vulpuis,²³ Klebs,²⁴ Noswinkel,²⁵ Schubert,²⁶ Behring,²⁷ and Ehrlich²⁸ have recently published papers, and, while the reports vary somewhat, the general impression is one of hope. The two following opinions are worthy of consideration, and all the more so as they look upon the question from different points of view.

At the meeting referred to above, Dr. Hansemann said Behring's blood serum therapeutics rested upon the basis that the cure of the infective diseases was really a process brought about by self-immunisation. *This was a theory—not a fact.* Behring further believed that human beings could be

immunised by the blood serum of immunised animals. Experiments made in that direction were not yet proved. He disputed Behring's claim that recovery always took place when the treatment was early, and referred to a number of fatal cases where the treatment was begun on the second or third day. The fact that paralysis of deglutition followed recovery in a striking number of cases, showed that the serum was not specific. Dr. Hansemann thinks that there are no scientific, theoretical, nor experimental proofs which would justify us in considering diphtheria-curative-serum as a specific against diphtheria, or that its curative action has yet been proved in practice. Lastly, he referred to the kidneys, rashes, hæmorrhages, fevers, weakness of heart, articular pains, coma, and albuminuria recorded, and maintained that blood serum has a destructive influence on the blood and kidneys. In spite of all this searching criticism, however, Dr. Hansemann did not deny that the serum exercised a certain curative influence of an inconstant nature, and this statement is extremely important. Somewhat bearing upon the more favourable aspect of the question, one of the most important communications which I have had the opportunity of seeing is that of Dr. Moizard.²² During October and November, 1894, he had the opportunity of using the blood serum in 302 cases admitted to the Hôpital Trousseau; 53 of these were proved to be non-diphtheritic by bacteriological examination, and of these 28 were in the hospital at time the paper was written. 10 of these were considered cured, but taking the 53 considered non-diphtheritic and the 18 still in the hospital, he writes an article upon 231 cases, and states that the mortality was 14·71 per cent. He considers that 9 of the cases included in the 231 were so ill on admission as to be beyond hope of treatment under any circumstances, and if these were deducted the mortality would be reduced to 11·26 per cent. Dr. Moizard points out that the organisation of his wards had to be changed some time previous to these experiments owing to the great mortality after operation. Now, patients are admitted into certain parts of the hospital and carefully examined, in all cases bacteriological examination being made. Those that are considered as non-diphtheritic are passed to one section of the hospital; those with severe complications are not allowed into the same wards of the hospital; and those suffering from diphtheria pure and simple are passed into the wards for this purpose. He attributes a great part of his success to care in selection. Further, Dr. Moizard carried out local treatment by means of

irrigations of boracic acid in water several times a day, and painted the throat with solutions of salicylic acid and glycerine. On admission to the hospital, each patient received an injection of 20 c.c. of serum, but the dose was repeated if unfavourable symptoms occurred on the second, third, or even fourth day after admission. Dr. Moizard further considers the complications, and combats the views expressed by Oertel and Ritter about the dangers of albuminuria. Dealing with the sequelæ further on, he states that in only 1 case did abscess follow the injection; that 23 cases showed skin eruptions—14 being urticaria, the others, various forms of erythema and 1 of purpura. As a result of his experience he considers the result of the injection of blood serum so harmless that he recommends its use without waiting for the results of cultivation, which takes so many hours. Of course, he gives certain reservations about this, and considers such treatment is justifiable only where one has clinical evidence indicating what may be considered an ordinary case of diphtheria. He goes further, and warns us against expecting too much in severe cases of albuminuria, broncho-pneumonia, or in fact where the constitutional conditions are so severe as to contraindicate the use of any remedy, and particularly in cases of severe disease of the kidney, where that organ has a difficulty in casting out deleterious matter.

A consideration of the different opinions expressed about the value of this remedy will easily convince one that a considerable time must elapse before any accurate conclusion can be arrived at. It need hardly be said, further, that bacteriological examination, for many reasons, should be an essential point, that the special preparation used should be carefully noted, also that the dose and number of doses administered are points upon which we yet need much information; and, lastly, that any disadvantages attending its use should be carefully recorded.

Note.—The references to the authors quoted in the text will be found at the end of the Appendix to this paper, p. 53.

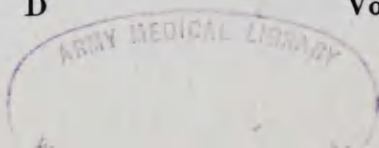
A P P E N D I X.

No. I.

REPORT UPON THE VIRULENCE OF THE BACILLI FOUND IN TWENTY CASES OF THROAT INFLAMMATION OF SUCH A CHARACTER AS TO AROUSE SUSPICIONS OF THE EXISTENCE OF DIPHTHERIA.

BY HALLOCK PARK, M.D., AND A. L. BEEBE, Ph.B.

	Severity.	Weight of Guinea-pig. gms.	Amount of culture injected. c.c.	Duration of life after inoculation.	Persistence of Loeffler bacillus after recovery of patient.
1	Very mild case; sick only 4 or 5 days.	485	2	40 hours	14-19 days
2	Subsequently contracted scarlet fever.	305	1	12 days	<i>Note:</i> Pig previously inoculated with non-virulent culture
3	Mild case.	350	1	45 hours	24-32 days
4	Mild case.	900	3	40 "	
5	Diag. — Char. follicular tonsillitis with history of exposure to diphtheria.	405	1	40 "	6 "
6	Very mild case; culture taken after disappearance of membrane.	430	1.5	40 "	13 "
7	Very mild case.	410	1.5	40 "	
8	Fatal case, and cause of severe case in mother.	435	1.33	40 "	P. 16 "
9	Mild case.	390	1.33	40 "	P. 38-41 "
10	Mild case; adult; never in bed.	210	0.5	50 "	P. 44 "
11	Removed to diphtheria hospital; severe case.	220	0.5	40 "	
12	Rather mild case.	620	3.33	25 "	P. 42 "
13	Very mild case.	479	2	40 "	P. 20-24 "
14	Fatal case; croup.	675	1.5	40 "	
15	Fairly severe case, followed by measles.	443	1.33	40 "	P. 15-23 "
16	Moderately severe case.	435	1.33	4 days	P. 15-19 "
17	Moderately severe case.	510	1.66	40 hours	
18	Fatal case; croup.	475	1.5	40 "	
19	Very mild case.	500	1.66	40 "	
20	Contracted from a mild case; no membrane present.	250	1	40 "	



No. II.

LENGTH OF TIME BACILLI MAY BE FOUND AFTER ILLNESS.

BY HALLOCK PARK, M.D., AND A. L. BEEBE, Ph.B.

Case No.	Severity.	Bacilli persistent after recovery for	VIRULENCE.			Persistence from inception of disease. days.
			Weight of Guinea-pig gms.	Amount injected. c.c.	Life of Guinea-pig after injection.	
1 (1300)	App. severe case but very quick recovery.	8 days	392	1.33	60-70 hrs.	13-17
2 (527)	Mild case.	10 "	250	0.5	8 days.	12-19
3 (1358)	Do.	12 "	290	1.25	11 "	(?)
4 (956)	Severe case.	18 "	229	1	9 "	21-30
5 (685)	Moderate case.	6 "	549	1.25	14 "	10-22
6 (909)	Mild case.	33 "	226	1
(Extensive necrosis with final recovery.)						
7 (1.13)	Very mild case.	12 "	440	1.5	About 40 hrs.	14-22
8 (R. Weed)	Mild case.	8 "	310	2	C. 40 hrs.	16-20
10 (1.19)	Very mild case.	25 "	505	1.66	C. 40 "	30 (?)
11 (1.20)	Very mild case (nasal).	10 "	253	2	C. 40 "	10 (?)
12 (1.21)	Lesion; brother had mild case.	6 "	490	1.66	C. 40 "	24 (?)
13 (1442)	Mild case.	8 "	450	1.33	C. 40 "	13-20
14 (1.23)	Recovered.	12 "	367	1.33	C. 40 "	19
15 (1.24)	Fairly severe case.	26 "	347	1.33	C. 5 days	35-44

No. III.

REQUISITION TO THE LOCAL GOVERNMENT BOARD SENT BY THE BRITISH LARYNGOLOGICAL AND RHINOLOGICAL ASSOCIATION.

A REQUISITION was sent by the Committee to the Right Honourable Henry Hartley Fowler, M.P., President of the Local Government Board, and Dr. Thorne Thorne. It was also resolved, at the October meeting of the Association, to send copies to the Local Government Boards in other parts of the kingdom.

The requisition pointed out that, "at a recent meeting of the British Laryngological and Rhinological Association, composed of physicians and surgeons from all parts of the empire, especially engaged in the study and treatment of diseases of the throat, a paper was read by Dr. Morris Wolfenden, emphasising the importance of the early recognition of the acute infective diseases of the tonsils, and the pressing necessity for the isolation of patients suffering from these disorders.

"As a result of the discussion which followed, a resolution was proposed

and carried that a representation should be made to your Honourable Board of the necessity for greater facility being afforded for bacteriological examination in these cases, by the establishment of stations for the purpose, such as is done in the city of New York, the details of which will doubtless be familiar to you.

“The Association does not for a moment presume to even suggest the means by which these facilities could be granted to medical practitioners, but would only point out that, while it is evident that the average family attendant, who is the first to see these cases during the initial, and therefore the most important epoch, is not in possession of either the requisite special knowledge or the facilities for pursuing such investigations, it must also be at once apparent that an accurate diagnosis at the commencement of those cases is of vital importance, not only to the individual attacked, but also for the protection of the community in general. Moreover, it need hardly be pointed out that many diseases in this region which may be regarded as infectious are not limited to diphtheria, though many of them, clinically so called, so resemble this disorder as to be only capable of differentiation by bacteriological methods.

“No true progress can be made in the proper classification of their relative virulence except by scientific research, and only by such a system can efficient notification be effected with a corresponding relief from the onerous responsibility which now presses on the medical profession in cases of doubtful diagnosis.

“It is confidently to be hoped that the early detection of such disorders, by the means indicated, would eventually lead to the diminution of diphtheria and allied disorders, now so alarmingly on the increase.

“It may, therefore, well be brought within the scope and duties of the medical officers of health and other officials under the control of your Department.

“The Association venture to think that on all these grounds, as well as many others which they forbear from pressing, no apology is needed for bringing this matter under your consideration.”

The requisition was signed by John Macintyre, M.B., Glasgow, President of the Association; Philip C. Smyly, M.D., Lennox Browne, F.R.C.S., Arthur W. Snadford, M.D., ex-Presidents; W. Macneil Whistler, M.D., R. Norris Wolfenden, M.D., M.P., Mayo Collier, M.S. and M.B., Vice-Presidents; Edward Law, M.D., William Milligan, M.D., Richard A. Hayes, M.D., Members of Council; and V. H. Wyatt Wingrave, Secretary.

No. IV.

LIST OF THE MORE IMPORTANT MICRO-ORGANISMS FOUND IN EXAMINATION OF THE NOSE AND THROAT.

BY JOHN MACINTYRE, M.B., F.R.M.S.

A.—PARASITIC OR SAPROPHYTIC FORMS.

Mouth Bacteria—non-cultivable.

- Scraping from tooth, showing round, spiral, rod shapes.
 Spirillum sputigenum—almost pure cultivation from human mouth.
 Spirochætæ dentium, from human mouth.
 Leptothrix buccalis—various forms.
 „ innominata—Miller’s classification.
 Bacillus buccalis maximus „ „ (high power).
 „ „ „ „ „ „
 Idococcus vaginatus „ „

Mouth Bacteria—cultivable.

Bacillary forms, various (health), showing spore formation.
 Cocci forms, various—cultivations on agar and gelatine.
 Ascoccus buccalis—*Miller*.

Fermentation Bacteria—zymogenic.

Bacillus acid lactici.

Colour-producing—chromogenic.

Cultures of organisms producing red-coloured matter in tubes.

”	”	”	green	”	”	”
”	”	”	yellow	”	”	”

Not classified above.

Micrococcus prodigiosus.
 Sarcinæ ventriculæ.
 Bacterium termo?
 Bacillus subtilis.

Fungi.

Spores from upper air passages (aspergillus).
 Aspergillus glaucus.
 Penicillium glaucum.
 Mucor mucedo.
 Mucor racemosus.

B.—PATHOGENIC FORMS IN UPPER AIR PASSAGES.

Cultivable for most part.

From sputum	—Bacillus crassus sputigenum.— <i>Kreibohm</i> . Micrococcus tetragenus.— <i>Koch, Gaffky</i> .
Inflammation	—Micrococci.
Suppuration	—Staphylococcus pyogenes aureus.— <i>Ogston</i> . ” ” albus. ” ” citreus. Streptococcus pyogenes.— <i>Ogston</i> . Varieties mic. pyo. tenuis, &c.— <i>Rosenbach</i> . Bacillus pyocyaneus.— <i>Gerrard</i> . ” pyogenes foetidus.— <i>Passet</i> .
Gonorrhœa	—Micrococci gonorrhœa.— <i>Neisser</i> . —Streptococcus erysipelatosus.— <i>Fehleisen</i> .
Pharyngo-Mycosis	—Bacillus fasciculatus, round and other forms.
Tubercle	—Bacillus tuberculosis in sputum.— <i>Koch</i> . ” ” tissues of larynx. ” ” lungs. ” ” liver. Bacilli of decomposition in sputum. Micrococcus tetragenus ”
Leprosy	—Bacillus in tissues.— <i>Hansen</i> .
Syphilis	—Bacillus.— <i>Lustgarten</i> .
Rhinoscleroma	—Bacillus.— <i>Frisch</i> . ” in capsules.
Actinomycosis	—Actinomyces in tongue.
Diphtheria	—Bacillus (false membrane).— <i>Klebs-Loeffler</i> . Pseudo-bacillus. Micrococci in false membranes. ” and bacilli, impure cultivations,

Pneumonia	—Pneumo-bacillus (pneumococcus).— <i>Friedlander.</i>
	„ in pus.— <i>Friedlander.</i>
	„ „ — <i>Fraenkel.</i>
	„ in lungs.— <i>Fraenkel.</i>
Typhoid	—Bacillus.— <i>Eberth-Gaffky.</i>
Malignant Disease	—Psorosperms.

C.—ENTRANCE OF MICRO-ORGANISMS TO TISSUES.

1. Mycelial spores passing through epithelium in living tissues.
2. Development within the tissues.

The investigator may also meet the following by contamination, &c.:—*Achorion schonleinii*, *trichophyton tonsurans*, *microsporon furfur*, &c. Biondi's¹ list includes *bacillus salivarius septicus*, *coccus salivarius septicus*, *micrococcus tetragenus*, *streptococcus septo-pyæmicus*, *staphylococcus salivarius pyogenes*. Kriebohm² mentions two non-cultivable forms found in mouth. These have not been included in the above list, as many of them are difficult to identify, and may appear under other names by different observers.

¹ *Breslauer Aertzliche Zeitsch.*, September, 1889, No. 18.

² *Flügge*, p. 319.

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