

**A practical treatise on diphtheria and its successful treatment / by
Brownlow R. Martin.**

Contributors

Martin, Brownlow R.

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DIPHTHERIA
AND ITS TREATMENT

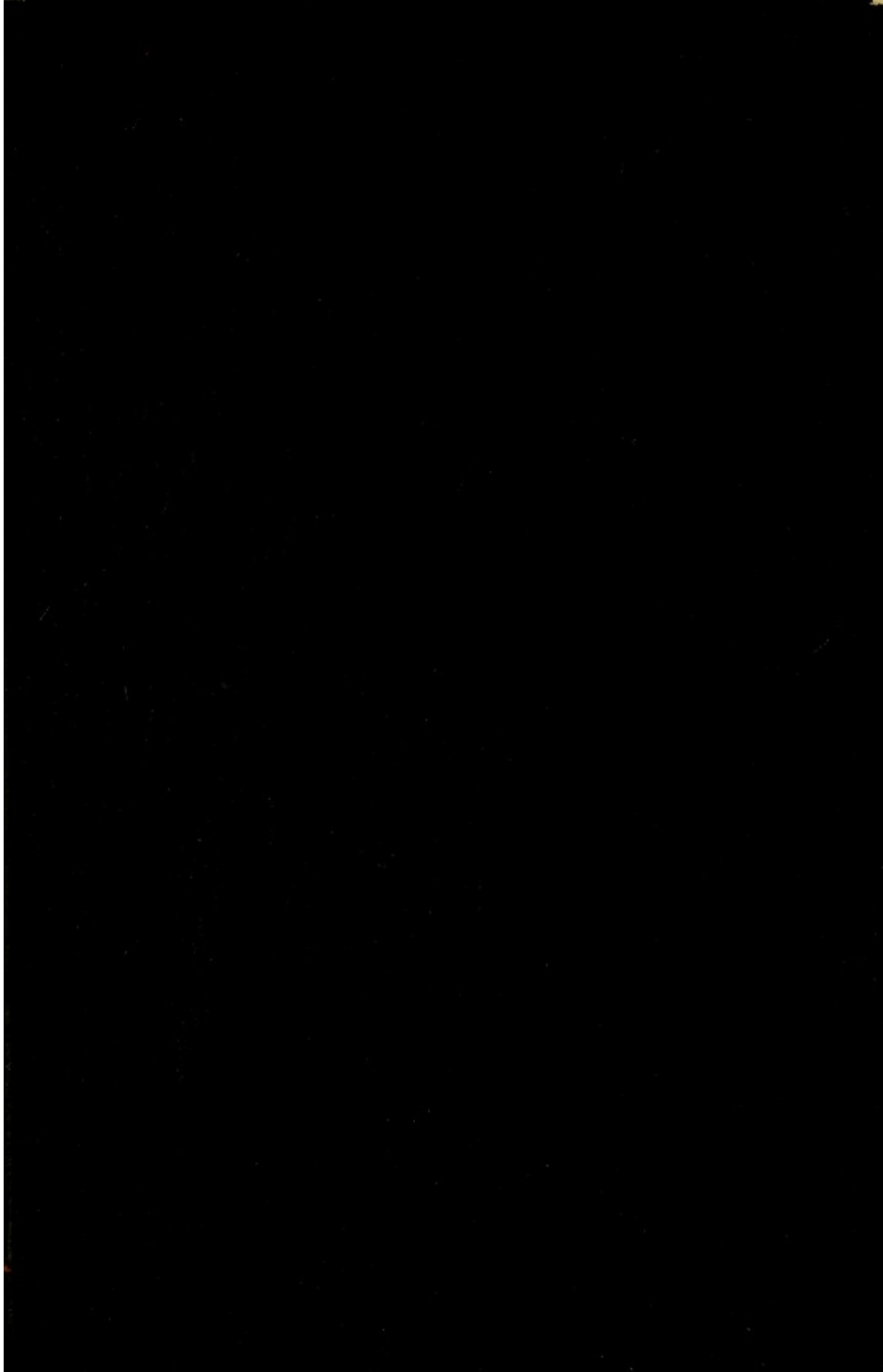
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ON
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TREATMENT.

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A PRACTICAL TREATISE
ON
DIPHTHERIA
AND
ITS SUCCESSFUL TREATMENT.

BY
BROWNLOW R. MARTIN,
A.B. AND M.B. DUBLIN UNIV. ; L.R.C.S. IRELAND;
FORMERLY CIVIL SURGEON IN H.H. THE NIZAM'S SERVICE.

SECOND EDITION.



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TO

HIS OLD FRIEND AND FORMER TUTOR

WILLIAM IRELAND WHEELER,

M.D. AND M.CH. DUBLIN UNIVERSITY;

FELLOW AND PAST PRESIDENT R.C.S., IRELAND;

VISITING SURGEON TO THE CITY OF DUBLIN HOSPITAL,

ETC., ETC.

1871

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PREFACE TO THE SECOND EDITION.

THE success which has attended the first edition of my little treatise has emboldened me to issue a second, revised and enlarged. I have found it necessary to enter a little more fully into the theoretical side of the question, in order to bring the work more up to date; but as far as possible I have avoided doing so to an extent which would deprive it of its original name 'Practical.'

40, Shaftesbury Road,
Ravenscourt Park, W.

THE HISTORY OF THE UNITED STATES

OF THE UNITED STATES OF AMERICA
FROM THE FIRST SETTLEMENTS
TO THE PRESENT TIME
BY
JOHN F. JOHNSON
NEW YORK: PUBLISHED BY
JOHN F. JOHNSON, 10 NASSAU ST.
1850

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1850

PREFACE TO THE FIRST EDITION.

IN the face of the numerous writings of distinguished authorities on the subject of diphtheria, it is an invidious undertaking to try and dilate any further thereon; still, having given years of study and attention to this disease, and having been urged by friends, both professional and otherwise, to make the result of my researches known, I feel it is my duty to comply with the request.

I am further prompted to do so from the fact that most of the works on the subject are from the pens of noteworthy scientists (to whom the whole world, as well as the physician, owe a debt of gratitude), and represent rather the discoveries made in the laboratory; therefore, an article written by a *practitioner*, as the embodiment of his ideas thereon, may bring to the minds of the medical fraternity the details of everyday experience.

I am well aware that I have failed in many points to carry out an ideal work, and that having in several places struck out what may be called a new line for myself, I may possibly have been led by enthusiasm into what may prove erroneous ideas; still, I think a basis will be found for them, and in a disease not yet *fully* understood, room may be found for speculation where sufficient grounds can be shown therefor.

It may be thought that in these pages a spirit of egotism has been exhibited by the author; let the readers be assured that nothing is further from his mind. The personal pronoun has been used simply for the sake of brevity, the work itself having been undertaken with a deep sense of humility and a complete consciousness of the position he holds as a very small unit in a most noble profession.

A PRACTICAL TREATISE
ON
DIPHTHERIA AND ITS SUCCESSFUL
TREATMENT.

THE number of victims claimed annually by diphtheria entitles every member of the medical profession to express his views on this malady and to do what he can to lessen the mortality therefrom, and in this way take his share in relieving suffering humanity.

The study of diphtheria has been for many years an object of special interest to me, and having discovered a method of treatment which has met with remarkable success—a success far surpassing my most ardent expectation—I desire to lay the subject before my *confrères* in a short treatise, fervently hoping that some advantage may be derived from a perusal thereof.

Diphtheria has been described by many authors under different titles, but it was not until the year 1826 that it was first pointed out as a distinctive disease by Bretonneau, under the name diphtheria (from *διφθερα*, a skin). Since that time there have been many epidemics of it, chiefly in Paris and Boulogne, and it is supposed that Washington and the Empress Josephine, besides many other notable people, succumbed to this affection.

Pathology. Various theories have been held as to the pathology of the disease. Some authors have thought that it is a poison disease acting primarily on the whole system, the exudation being only a local manifestation, while others—among them Trousseau—that it is an infection of the patient by the absorption of the poisonous material of the false membrane. It is not my intention in these pages to discuss the conflicting opinions of many noteworthy scientific scholars, contenting myself with giving a *résumé* of some of those held by them, it being my sole desire to attempt to give my readers the result of ‘practical’ experience derived from years of close attention and careful observation.

Author's
definition.

I shall begin by defining diphtheria, as it presents itself to my mind, as a zymotic disease,

that is to say, an epidemic or endemic affection, due to some contagious poison, and characterized by both general and local symptoms, of which the general symptoms are those connected with all toxæmic affections, the local one being the formation of false membrane *primarily* in the throat, it being my firm conviction that when it occurs elsewhere it is either by continuity, or by metastasis, or by secondary toxæmia; and I found this belief on the fact that it is possible, as I hope to prove conclusively later on, to abort the disease or cut it short, if firmly grappled in time.

Dr. Booker (quoted in *Medical Annual*, 1894) says: 'Diphtheria bacilli were found in the spleen and other organs of a child, which agrees with the recent investigations of Franch, that these bacilli may pass from the original seat of infection to other organs of the body.'

Numerous, and in many instances far-fetched, Etiology. causes have been assigned for the disease, some of which I shall enumerate: the fungi which spring from damp soil, sewage poison, diseased potatoes, impure water, heredity, age, predisposition, animal and vegetable refuse, milk from diphtheritic cows, and it has been supposed to spring from cats, pigeons, and fowls.

Of these theories the majority have been dis-

proved. Of age, it may be said that it more frequently occurs during childhood and youth. With regard to milk, cases have been traced to farms on which the cows were suffering from febrile affections, and it may be undoubtedly looked on as a vehicle for conveying the poison. Heredity may be a predisposing cause. Of the others little need be said. In later years it has been traced beyond the power of question to a micro-organism, and that described by Professor Löffler and Klebs is now recognised as the diphtheria bacillus.

Sympto-
matology.

As I have stated in my definition, the symptoms are both general and local. The general are malaise, increased temperature, *slight* sore-throat, and enlargement of the sub-maxillary glands, asthenia, and in more severe cases, rigors, vomiting, and signs of collapse. Diphtheria always is of an asthenic type, and in some cases death has ensued from this cause alone (fatal asthenia), the system being, so to speak, knocked down at once by it. Another prominent symptom almost invariably present is albuminuria, which seems probably to be due to physical degeneration, as well as internal congestion. The late Dr. Cormack (Quain's 'Dictionary of Medicine') attributes the presence of albuminuria to (1) Rapid waste of

tissue and altered state of the blood. (2) Want of assimilation of the food. (3) Obstruction of the air-passages, causing congestion. The local symptom is the formation of false membrane, of which I shall speak more fully later on.

The affections with which diphtheria may be confounded are croup, scarlatina, follicular pharyngitis, tonsillitis, putrid sore-throat, and aphthæ. Diagnosis.

Diphtheria is distinguished from croup in that in the latter the affection commences in the larynx; in the former it begins in the throat and pharynx.

Mr. Lennox Browne ('Diseases of Throat and Nose') differentiates thus: 'Croup is sporadic and non-inoculable; it attacks children, rarely youths, and never adults. It is not infectious; the exudation is the essential feature in causing death by mechanical obstruction. The glandular swelling in the neck, so universal in diphtheria, is not present in the non-specific disease. It is sthenic rather than asthenic in its features. The pulse is hard and strong in most cases. In croup the urine rarely contains albumin, and paralytic sequelæ are absent.'

From scarlatina, by the eruption and strawberry tongue of the latter. Dr. Booker gives

a very clear description of the distinction between them, which it would be difficult to improve upon. He says: 'The secretion of diphtheria is white, thick, tough, and strips off in shreds; suppuration is exceptional; there is no ulceration, and it extends on the surface by continuity, preferably to the air-passages. That of scarlatina is yellow, cannot strip off; ulceration generally takes place, suppuration frequently, and it spreads to the ear rather than the larynx.'

From follicular (lacunar, Lennox Browne) tonsillitis and pharyngitis by the consistency of the secretion: in both of the latter it is white and flaky, and can easily be brushed off. In diphtheria it is fawn-coloured and adherent, and if detached, bloody and fetid sanies exudes.

Aitken, in the *American Practitioner and News*, October 8, 1892 (quoted in the *Medical Annual* for 1894) relies on the following points (among others) in the differential diagnosis between diphtheria and follicular tonsillitis:

DIPHTHERIA.	FOLLICULAR TONSILLITIS.
Invasion gradual, often insidious.	Invasion abrupt.
Temperature rises gradually, course of fever irregular.	Temperature for first twenty-four hours 102° to 105° . Lasts three days.
Marked asthenia.	No tendency to asthenia.

DIPHTHERIA.

Pulse slow and irregular.
 Glandular swelling almost invariably present.
 Nasal regurgitation and bloody discharge.
 Albuminuria present with low temperature.
 Highly contagious.
 Paralysis common.
 Fiery blush over whole throat.
 Isolated spots, coalesce, gray early, greenish later.
 On tonsils, uvula, and pharynx.
 Mucous membrane bleeds on removal of membrane.
 Infiltrates tissue, and cannot be wiped off.
 Reforms, if removed.
 Spreads.

FOLLICULAR TONSILLITIS.

Pulse rapid and full.
 Glandular swelling absent.
 No nasal regurgitation or bloody discharge.
 Slight albuminuria, only if temperature is high.
 Contagion doubtful.
 No paralytic sequelæ.
 Blush usually on tonsils only.
 Isolated yellow spots, or continuous membrane.
 On tonsils only.
 Does not bleed.
 Superficial ; can be wiped off.
 Does not reform.
 Does not spread.

Mr. Lennox Browne says : ' The temperature is usually high in tonsillitis, but it rapidly falls, especially in the rheumatic variety, on the appearance of the lacunar exudation or on formation of pus.'

From the gangrenous eschars of putrid sore-throat : in the latter there is deep and extensive sloughing, and the patient, for the most part, dies of exhaustion. In diphtheria there is no sloughing, but something added, and the sufferer dies of asphyxia.

From aphthæ : the latter begins in the mouth,

and seldom occurs in adults ; besides, the constitutional symptoms are far less severe than in diphtheria.

Post-mortem appearances.

The chief post-mortem appearances found in diphtheria are engorgement of the submaxillary glands ; a granular superficial infiltration of the mucous membrane, the cellular tissue being loaded with sanious pus ; a congested state of the internal organs with transudations into the serous membranes. The characteristic pellicle which constitutes the disease may be found in the pharynx, larynx, and trachea, nostrils and inner ear, and, moreover, on remote parts of the intestines.

Physical appearance of the membrane.

The physical appearance of the membrane is aplastic (cacoplastic, Dr. Cormack). Under the microscope it is fibro-laminated, made up of corpuscles, epithelial cells, and layers of fibrinous net-work, without organization or development ; of a dirty yellow or ash-gray colour.

Complications.

The complications that have occurred during the progress of a case of diphtheria are scarlatina, albuminuria, bronchitis, pneumonia, puerperal and typhoid fevers, urinary and perineal diphtheria, erythema, croup, tubercle, etc. It is hardly necessary to say that any of these add seriously to the danger which already

exists. The author has seen scarlatina succeeded by diphtheria, and intimately blended therewith. Albuminuria is an almost constant concomitant, so constant that it has come to be regarded as a symptom, but does not, unless scarlatina is also present, cause any permanent mischief. Pneumonia is a very serious complication, and will be found either of a low typhoid type or else hypostatic. It is not necessary to enter into details about the other complications mentioned.

The sequelæ of cases of diphtheria are Sequelæ. numerous, the chief being long-continued debility and paralysis, which may be either local or general; it may only attack the palate and regions thereabout, affecting the powers of speech and deglutition, or it may give rise to general paralysis of the whole body. Other sequelæ that have been met with are heart-disease, angina pectoris, emboli, syncope, encephalitis, blindness, etc.

It would be a work of supererogation to mention one quarter of the number of the remedies that have found favour in the eyes of various physicians. I shall merely allude briefly to a few which seem most meritorious. First, and in the front rank, stands tincture of the perchloride of iron, either alone <sup>Treat-
ment.</sup>

or with chlorate of potassium. For general treatment this seems to be admitted on all hands to be the remedy *par excellence*. In the hands of some practitioners benefit has accrued from carbolic acid. Other remedial drugs are: permanganate of potassium, boracic acid, salicylic acid, sulpho-carbolates, biniodide of mercury, pilocarpine, oil of eucalyptus, resorcin, chloride of ammonium, ice, sulphites. Dr. Radcliffe recommends sulpho-carbolate of sodium in doses of from three to five grains. Intubation is recommended by Dr. Joseph O'Dwyer of New York. Antitoxin was discovered by Professor Behring. Dr. Seibert has invented a very ingenious instrument, with which he injects the affected part with chlorine water. Professor Löffler recommends corrosive sublimate, 1 in 10,000; cyanide of mercury, 1 in 8,000; chlorine water, 1 in 1,000; thymol, 1 in 500; alcohol, 20 per cent., etc.

It is far from my intention to find fault with any of the treatments advocated by experienced physicians, but I claim for my own (which consists of insufflations, frequent and free, of sulphite of magnesium) the following merits: its simplicity, efficacy, freedom from pain or danger; the fact that, being a perfect bactericide, it prevents the formation of more mem-

brane, and that which has formed sloughs off; and, being in the form of a very fine and sparingly soluble powder, it not only acts on the fauces and pharynx, but it also penetrates into the larynx and air-tubes, and may succeed where other remedies fail.

Having now briefly scanned some of the literature on the subject, I will endeavour to give my own views on the 'practical' side of the question, and even at the risk of being considered prolix, it is my intention to enter into the matter as minutely as I possibly can.

Let me trace the course of a typical case of benignant diphtheria, and although, so far as I can find out, I am the first to do so, I am of opinion that, without the slightest stretch of imagination, it would be justifiable to divide it into five distinct stages, viz.: 1. The stage of incubation. 2. That prior to exudation. 3. That of exudation. 4. The formation of false membrane. 5. Convalescence or the reverse. In the first stage we find the usual febrile symptoms: temperature ranging up to 102° Fahr., headache, pains in the limbs, and general malaise. These not subsiding, and no exanthem or other fever appearing, upon examination of the throat an appearance externally

and internally will be found which to me is characteristic. Externally the submaxillary glands are enlarged, and have generally a doughy or œdematous feel to the touch. Internally, the tonsils, the pharynx, or the soft palate, severally, or all of them, are of a dusky-red hue with a *granular* surface. No exudation is yet to be seen, but a keen observer will suspect, if he is not absolutely able to pronounce, what the disease is. This is what I see fit to call the second stage. The third stage rapidly succeeds. Now will be found the exudation gradually welling up between these granulations. The late Dr. Ranking, senior physician to Norwich Hospital, in his lecture, delivered in the year 1859, says: 'The uvula and tonsils are coated with a fawn-coloured fetid membranous deposit. Below this the mucous membrane is deep red with *papular elevations*' (these are the granulations I mention, but I consider they can be seen before the exudation takes place). This exudation is of a yellowish-coloured aplastic lymph. As the disease advances, this exudation, coalescing into a patch or patches of false membrane, constitutes the fourth stage. In the next stage, if unchecked, the membrane extends to the larynx and bronchi, but this seldom happens in the mild form with the use

of suitable remedies, and convalescence, as a rule, may be looked for.

Now trace the severer form. In it all the symptoms are aggravated. It is generally ushered in by a rigor—high fever, 103° - 105° Fahr., and vomiting; then, in the second stage, will be found slight pain in swallowing, the fauces seem engorged and tumefied, and there is considerable prostration. In the third stage abundant fetid lymph exudes from numerous small spots, always calling to my mind what is seen in the commencement of a carbuncle. The fourth stage supervenes, and we find the fauces, soft palate, and pharynx covered with a false membrane, which possibly invades the posterior nares, soon extending to the larynx, and in a short time the patient, asphyxiated, succumbs.

I will ask any one of my readers, who has an opportunity of judging for himself, to watch closely and see if my statement cannot be verified. I do not for one moment wish it to be understood that all these signs can be seen in every case, because in some the changes occur very rapidly, and in others we are not called until the disease is well advanced; but I have seen these distinct stages so frequently that, reasoning from analogy, I am led to

believe that they occur in almost all (if not all) of them.

I wish clearly to point out that it is my experience and conviction that diphtheria runs a most definite course, and that therefore it is in the physician's power to detect it early, and to absolutely abort, or at any rate cut short the attack. No doubt, as in all diseases, there are abnormal cases, but all must agree that the treatment becomes much simplified if we know that we are dealing with a definite disease, which, as a rule, runs a definite course, and springs from a definite origin (a micro-organism).

The most important points for a young practitioner to bear in mind are the insidiousness of the disease, and the remarkable freedom from pain referred to the throat. This alone seems to me sufficient to diagnose diphtheritic throat from almost any other affection there. Scarlatina, tonsillitis and ulceration are all attended with a considerable amount of pain, especially in swallowing, whereas in diphtheria the throat is in numerous instances not complained of at all, or only slightly, even when the affection has advanced to a dangerous degree. Hence it is that the malady may be overlooked, especially when some other epidemic, such as influenza, is

about. I must confess that I have on several occasions known persons to walk into my surgery during the late outbreak, and I have been on the point of declaring the case to be one of incipient influenza until I examined the throat, and, although no pain was complained of, nor even inconvenience there, I have found on various parts of the fauces numerous diphtheritic patches.

It will now be my endeavour to prove that the disease can be aborted, or, at least, cut short. To effect this I must illustrate my remarks by putting forward some cases. If I can from them show that, by the treatment which I am about to advocate, I, in the first place, have attended one in the second stage (before exudation), and not let it reach the third stage (of exudation); and again one in the third stage, and not let it reach the fourth stage (of false membrane); and again one in the fourth stage, and not let it proceed any further, I feel that I shall have gone a long way towards proving my dictum.

CASE I.—In August, 1892, I was attending a friend's child and one of my own. Both were similarly affected with febrile disturbance for about twenty-four hours. At the end of that time, that is to say, on the evening of the

second day, in both cases I found the sub-maxillary glands enlarged, and the throat dusky-red, with granulations, but no sign of exudation. I felt comparatively certain I was dealing with two cases of diphtheria, and put my friend's child under immediate treatment, and, to be brief, the malady did not develop at all, and the child made a speedy recovery. As my own child was under my immediate supervision, I decided to leave the treatment until the morning, and had her removed into a cot by my own bedside. In the short space of about four hours I was aroused by her stertorous breathing and ringing cough. On examination, I found that the soft palate, uvula, tonsils, and pharynx were thickly covered with false membrane, and that all the signs of laryngeal diphtheria were present. For seventy-two hours she hung between life and death, but by assiduous treatment she ultimately recovered, and is, I am thankful to say, strong and well to this day. Can there be any doubt that in the case of my friend's child the malady was aborted, and that my own child was saved by the treatment that I will set out? N.B.—No sequelæ occurred.

Another example of this: On March 6, 1893, I was called to see H. F. B., a boy of six years

of age. On examination I found well-marked diphtheritic patches on the tonsil, uvula, soft palate, and pharynx. I isolated him, no one having access to the room except his mother. At my visit on the 8th I found the latter completely prostrated. All the parts composing the fauces were suffused with the characteristic red colour, and œdematous, the submaxillary glands enlarged, and, taking all circumstances into consideration, evidently threatened with (according to my theory, suffering from) an attack of diphtheria. I put her also under prompt treatment, and both recovered, in her case the affection not proceeding any further. I might give many more similar examples.

CASE II.—On March 5, 1893, Miss P——, living at S—— Road, came to me in company with a trained nurse. From particulars that I gathered, I found that Miss P——'s stepsister, aged eight, had just died after tracheotomy, performed as the last attempt to save her life while the victim of diphtheria. This young lady had assiduously nursed the child, inhaling her breath, and being in every way subjected to the diphtheritic virus for fourteen days. As Miss P—— did not feel well, the nurse persuaded her to see a medical man, and they walked to my house. On examination, I found

that every sign of a most severe case of diphtheria was before me. The fauces and surrounding regions were of a lurid red colour and highly œdematous, and from numerous points the exudation was springing forth. Immediate treatment was used and constantly repeated. No membranous patches formed (I may say were permitted to form), and on the sixth day from her seizure I was able to pronounce her free from all danger from the primary attack. Up to the present there seems no sign of any secondary symptom. She subsequently developed erythema, from which she recovered in a few days.

CASE III.—Sister E——, one of the nurses attached to a mission here, was first seen by me on October 20, 1892. In her case the membrane had formed when I saw her. I need not go through details. Under treatment the membrane rapidly dissolved; the exudation continued till October 25, when it disappeared, and she made a rapid recovery, without any sequelæ.

CASE IV. was like this, except that one child in the house had already died, and when I was called the doctor in attendance had pronounced this case hopeless. As he retired from the case, I was obliged to attend it alone. This

was a little girl called N——, whom I found in considerable danger, the membrane having extended to the larynx. In five or six days the membrane and exudation had disappeared, and she made a good recovery, without any sequelæ.

I could adduce numbers of other cases, but I have mentioned sufficient, I think, for my purpose. Has it not been sufficiently shown from a practitioner's test, namely, that of results, that the definition given by the author at first of this malady is correct, or that there are at least considerable grounds for such?

To recapitulate, I think it has been conclusively proved by me that the disease can be arrested in the throat, and from that I draw the inference that the *primary* local seat of it is the throat, which was the problem I at first essayed to prove.

The late Dr. John Rose Cormack (Quain's 'Dictionary of Medicine') says that in 98 per cent. of cases the exudation commences on the pharynx or tonsils. May it not, therefore, be reasonably argued that in the remaining 2 per cent. the cases have run an abnormal course, or, as I have stated 'its appearance' elsewhere, may be attributed to 'continuity, or metastasis, or secondary toxæmia'?

Some may, and I expect will, object to my dividing the course of the disease into stages. I do not press the point, for it is comparatively immaterial to my argument; it suffices for me, if a malady is seen in a certain condition (be it stage or not), and, instead of going from bad to worse, is there and then arrested.

An illustration of this. A member of a family has been undeniably suffering from diphtheria, another member or other members take ill, a remedy is made use of, and in none of them the malady develops; although it may be difficult to say absolutely that the latter have had the affection, is there not ground for suspicion that such has been the case? This has occurred in my experience time and again. May it not be claimed that some of the cases have been aborted by the action of the remedy?

Author's
treatment.

It remains for me to bring the treatment forward. It has been pointed out that diphtheria has both general and local symptoms, therefore it requires both 'general' and 'local' treatment. In the former due regard must be taken to hygiene, diet, and medicine. One of the first precautions is isolation, not delayed until the disease has declared itself, but put in force the moment it is suspected. The patient

General
treatment.

should be placed in a spacious room, with plenty of fresh air without draughts, and he should be kept warm, but not oppressively so. An equable temperature of about 60° Fahr. should be maintained in the room, and it is of advantage to have a steam-kettle. The diet must be highly nourishing and stimulating—milk and beef-tea, egg-flip, tea, coffee, meat-juice—and it is advisable that, as far as possible, the foods should be peptonized, as there is considerable derangement of the functions of digestion. I am not in favour of actual stimulants, such as brandy, etc., until they cannot be dispensed with, wishing to keep them as a reserve force. The medicine on which I rely is iron, and I generally couple it with chlorate of potassium. If the case is seen early, mild diaphoretics and diuretics are required, such as acetate of potash and Mindererus' spirit. I consider antipyrin too depressing, and on that account avoid it. Later on, when convalescence arrives, quinine alone, or, better still, with iron, and possibly strychnine, are most trustworthy. The great thing necessary is to support the strength, and assist nature in repelling the poisonous character of the disease; therefore nervine tonics are the mainstay on which the physician must lean. Avoid emetics; they

wear out the patient and do no good, as the membrane will almost certainly form again after their use.

Local
treatment.

The *local* treatment on which I have entirely relied for more than six years is free and frequent insufflations of sulphite of magnesium (magnesii sulphis). During that time I have not lost one single sufferer from this malady, a record which will bear comparison with that of any practitioner operating with any other remedy. The moment I suspect a case I commence with it, and, as I have argued before, is it not fair to claim for my remedy that by its action some cases at all events have been nipped in the bud?

In those cases where exudation alone has taken place, I have not in one single instance seen a formation of false membrane, and in those in which the false membrane has already formed, it is surprising how short a time it has taken to disperse it, and in no instance has there been a return under the continued use of the insufflator.

In mild cases of diphtheritic throat, even when patches of membrane have formed, I have seen every vestige of them and of the exudation disappear in from forty-eight to seventy-two hours, and the worst case that has come

under my notice since I commenced this local treatment has not had a trace of throat complication in a week (with the exception of W. B——, mentioned on p. 57).

It will be noticed that in bringing forward some of my cases I have in each of them pointed out that there have been no sequelæ. Herein, to me, lies the charm of the remedy. The micro-organism is absolutely destroyed, and does no more mischief.

The points, therefore, that I claim for this remedy, as before stated, are that it is safe, simple, efficient, a perfect bactericide in diphtheria, and, moreover, being in the form of a very fine and sparingly soluble powder, it is during inspiration drawn into the larynx and bronchi, acting when other remedies will probably fail. Even with children there is but little difficulty in using it, an advantage that can scarcely be claimed for any of the other medicaments heretofore employed, although I have no doubt that in suitable cases they may be very effective.

The interpretation of the phrase 'free and frequent' use of the insufflator must be left to the discretion of the physician in charge. One cannot draw a hard and fast line, much depending on the severity of the attack. In mild

cases it may not be necessary to call upon it more than twice or three times daily, and half a dozen times, or even less, may be as often as it may be required altogether. In severer attacks it should be used every one, two, or three hours, according to circumstances.

I have already expressed my opinion that diphtheria 'primarily' attacks the fauces, and I wish to point out why and how this comes about. I believe that the diphtheritic virus invariably enters the system by inhalation, omitting from this category those cases where a surgeon or nurse with a cut or abrasion is directly contaminated with the poison in that way, and those of a similar nature. The bacilli drawn in by the mouth or nose lodge in the throat, for the most part on the tonsil, soft palate, uvula, or pharynx.

Having found there a suitable medium for their development, they pass through the porous mucous membrane to the middle and deeper layers, where they rapidly multiply, ere long producing those pathological changes which result in false membrane, the characteristic of diphtheria. While this is going on, the patient at the commencement exhibits the ordinary symptoms of febrile disturbance, although no physical sign may be present in

the throat (first stage of incubation). The presence of these bacilli, acting as foreign bodies, soon causes the throat to assume the inflammatory hue and œdematous appearance already described as the second stage. In the next stage, the bacilli, which have increased in numbers enormously, set up rapid decomposition of the parts in which they are located, becoming manifest in the form of exudation, the result of putrefaction caused by their presence. This constitutes the third stage. As these micro-organisms continue to increase, both by direct fission and by spore formation, the exudation becomes more plentiful and thicker (pseudomembranous) from the disintegration of the tissues (fourth stage). The danger then arises that the patient may perish from asphyxia. The other dangers appear to me to be the result of septicæmia, from absorption of the poison set up by the presence of these bacilli. Thus it will be found that the views held on the subject, among others, by the late Dr. John Rose Cormack on the one hand, and those of Trousseau on the other, were partly right and partly wrong, there being, I believe, in the first instance, a primary poison, the result of contagion, and if this is unchecked, a secondary poison, the result of septic absorption.

It has been my effort to show in these pages that, if the disease is recognised at the commencement, when we have only bacilli to deal with, and no spores, it is quite possible to destroy the former off-hand, so that not a trace may be left in forty-eight hours. If, on the other hand, the malady has advanced, and the spores become established, we shall probably have to cope not only with a succession of organisms, according as they are reproduced, but also with the secondary poison set up by their baneful presence. It will therefore be readily seen that it is of vital importance to diagnose the case at the earliest possible moment.

It may not be out of place to mention that for the first ten years of my professional career I never saw a case of diphtheria. During that time I had probably, with this exception, prescribed for every affection of the throat to which flesh is heir, consequently, when I came into the presence of this malady, I perceived that I had something wholly novel to deal with. This fact, together with its having been my unfortunate (or, perhaps, from a professional standpoint, fortunate) lot to have had diphtheria on four occasions in my own house, naturally aroused my exertions, besides giving me a very

great opportunity of studying its nature minutely, and what I have discovered from that observation it is my desire to endeavour to make known to my readers.

A question naturally arises as to why one person should be seized by diphtheria while another escapes, both having been subjected to the same contagion, and why one should take the disease more violently than the other. This is not easy to answer, but probably much depends on the state of health that a person is in when attacked, and, again, on the condition of the throat itself. A patient subject to quinsy, chronic affections of the throat, and such-like, appears more likely to fall a victim than one not thereto disposed. So to speak, the soil in the one case is a more favourable medium for incubation than the other. Moreover, a man in sound, ruddy health is better able to resist the virus than a weakling. This may, to a great extent, account for the fact that children are more liable to diphtheria than grown-up persons, their tender frames being unable to avert the severity of the poison.

The mortality among young children may be largely attributed to the narrowness of the air-passages, as also to the difficulty the physician finds in applying suitable remedies thereto;

besides, a child being unable to point out the seat of its trouble, the malady may be overlooked until too late. I would earnestly entreat my younger fellow-practitioners never to omit viewing the throat if there is any doubt in the diagnosis. If a mother says that her child has earache, the possibility, or the probability, is that the throat is engaged in some way or other. We cannot be too careful. Run the fingers gently over the parotid and submaxillary glands (especially the latter), and if anything is astray you will seldom fail to discover it thus. This is a very simple task, and many a life might be saved by its non-omission.

I would like here to point out a not uncommon place for a diphtheritic patch, which above others may escape the notice of the non-observant. This is when it is situated on the side of the pharynx, and behind the tonsil, probably extending upwards into the posterior nares. In these cases the tonsil is generally swollen, and it is almost necessary to hook it forward before the seat of mischief can be brought into view.

I would like to enter a little more fully into the various stages (or phases) of diphtheria as propounded by me, for it is all-important that an attack should be made on the micro-

organisms at the earliest possible moment. A few words will suffice for the first of these. I do not think it within the bounds of possibility to diagnose diphtheria in this, the incubation, stage. If one person in a house is beyond doubt suffering from diphtheria, and a second has been subjected to contagion, as a mother attending upon her child or a nurse upon a patient, we may, as I have said, have reasonable ground for suspicion that an attack of diphtheria is impending when we find an increase of temperature, pains in the limbs, languor, etc.; but as far as physical signs are concerned, we are absolutely without anything on which we can speak with certainty.

Let us pass to the second stage. On this point I find most difficulty in clearly convincing my readers that my opinion that diphtheria can now be diagnosed is correct; still, I will endeavour to argue the point in my favour. At this period of the disease I believe it may be quite possible that no bacilli may be found, for they are few in number, and we have no guide as to where to look for them; further, they may be concealed in the crypts of the tonsils or in the posterior nares. They are doubtless present, but we may fail to find them. There is no likelihood of a fatal issue

at this earthly period of the disease to conclusively prove the statement by a post-mortem examination, nor could we explore the whole mucous surface of the sufferer to discover their presence. Even for one moment admitting that the diagnosis may not be conclusive, it will be generally conceded that the throat is suffering from sepsis, and as a percentage of septic sore-throats will develop into diphtheria, we can do no harm by insufflating the throat. I have on many occasions seen this appearance of diffused redness, enlarged submaxillaries, and œdematous mucous membrane in persons attending on diphtheria, and it has all passed away under the use of the insufflator.

A friend of mine, in a place in which I was located, once said to me, 'Treat all persons in this neighbourhood as dishonest until they have proved their honesty'; so I say, 'Regard every sore-throat as a suspect until it has proved itself above suspicion.' From a prolonged and careful observation of diphtheria, I am satisfied in my own mind about this second stage, and by commencing to treat these cases as if they were diphtheria from the moment that I see this appearance, I have to a very great extent removed diphtheria (as generally regarded as such) from my practice, except in

a very mild form, and absolutely saved my patients from a fatal issue.

In the 'Year-book of Treatment' for 1894 (p. 452), Professor Corfield, in an article on public health and hygiene, says: 'Among the host of other [preventive] measures which will occur at once to the reader, the prompt isolation and treatment of all those suffering from throat ailments, however slight, when a diphtheria epidemic threatens, must be regarded as a powerful means of staying its spread, for *many of the milder throat affections, though they do not present the appearance of true diphtheria nor induce the same symptoms, certainly have the power of communicating that disease to others.*' (The italics are mine.)

With the first part of this sentence, as to the efficacy of isolation and treatment, everyone must agree; but if the germ theory is correct, and we concede that these 'milder throat affections' can give diphtheria, is it not a legitimate logical conclusion to draw, that they are themselves true diphtheria, or a further proof of the correctness of the second stage of diphtheria by my theory? Is it not a much more reasonable argument that those 'milder throat affections' have been true diphtheria, but that the germination of the organisms has been checked

either by the administration of a germicide, or by the leucocytes themselves, which have been secreted by the tonsils? I have myself seen this class of sore-throat proceed on to exudation and membrane when left alone.

I am aware that so high an authority as Dr. Thorne has given it as his opinion (*vide Medical Press and Circular*, June 17, 1894) that 'an ordinary sore-throat passed from one to another gets worse and worse until it culminates in an attack of diphtheria, there being a progressive increase in the infectiousness of the disease-organisms which produce diphtheria'; and he attributes this property to his looking on diphtheria as 'unstable, and capable of acquiring disease-producing properties which it did not previously possess.' I will not argue this question; but he at the same time gives it as his opinion 'that diphtheria never attacks a healthy throat, but on an inflamed and denuded sore-throat the diphtheria organism likes to fasten.' Is not this another reason why 'sore-throats' should never be overlooked or trifled with?

To me the term diphtheria is a misnomer, or, at least, misleading, unless used in its most comprehensive sense. As we can have influenza (better called *la grippe*) without any flux,

so we can have diphtheria without any membrane (diphthera) ; that is to say, these cases would eventually develop into membranous diphtheria unless checked by a germicide.

I have thought it necessary to use all these arguments in favour of my theory of stages (and especially of the second stage), for it appears to me of paramount importance that the disease should be thus early recognised. The remaining stages which I have enumerated are already too well known to require further remarks from me.

Before leaving this theory of stages, I take the liberty of again quoting from Mr. Lennox Browne. In his work 'Throat and Nose,' 4th edition, after alluding to the INCUBATION stage (p. 341), he goes on to say (p. 343) : 'The primary local manifestation of diphtheria usually appears as an INFLAMMATION of the fauces, not necessarily uniform, attended with EXUDATION, which proceeds in most instances to the formation of FALSE MEMBRANE. This surface inflammation may be somewhat MOTTLED. . . . The inflammatory redness gradually extends over the entire mucous membrane of the throat, but the deposit may commence at any one spot,' etc. Again (at p. 349), 'The fauces, at first RED, will soon become the seat of EXUDA-

TION PATCHES, which can be observed TO INCREASE IN THICKNESS, TO BECOME TOUGHER IN CONSISTENCE, and to extend sometimes quite rapidly in area. . . . If the pseudo-membrane is artificially removed, either a slightly-eroded GRANULAR surface, or else a raw and hæmorrhagic one, is seen.' (The capitals are mine.) Let me point out the striking resemblance between these sentences and the result of my own observation, as clearly demonstrated by the words in capitals.

Dr. George Fleming, Principal of the Army Veterinary Department, eradicated glanders from the horses of the British army. I believe that it is equally possible to drive diphtheria out of existence, or turn it into a comparatively harmless malady. True, the cases are not exactly similar; but, with improved sanitation as a preventive, a clear and early diagnosis, a thorough comprehension of the disease, and a suitable as well as efficient remedy, there is no reason why it should not be so.

It is with very great satisfaction that I find that the views expressed by me are very considerably corroborated by later writings. In the 'Year-book of Treatment' for 1894 (to quote again therefrom) at p. 189 will be found the

following: 'Further bacteriological observation and experiment have on the whole confirmed the original conclusion of Löffler, that diphtheria is due to a specific bacillus, which flourishes at the seat of infection, does not infect the blood or system generally, but produces its systemic effects by means of soluble toxins.' Does not this exactly represent the result of my own observation, viz., that there is a primary poison from contagion affecting only the part engaged, and a secondary poison, the result of absorption, infecting the whole system, or, in other words, septicæmia? Again, on p. 190 (*ibid.*) will be found: 'Kossel gives fuller details of eleven cases—two died; in one of these good reasons are given for believing that septicæmia, if it did not directly determine the fatal result, at least contributed very largely to bring it about.' Does not this remark strengthen my statement that the danger of a fatal termination consists not only in asphyxia, but also in septicæmia?

Before bringing forward any arguments in favour of the treatment that I advocate, it appears to me that it would throw considerable light on the subject if I make a slight digression and briefly scan what is known as the germ theory.

The researches of Pasteur, Koch, Löffler, Kohn, Lister, Klebs, Bilot, Watson-Cheyne, and many others, have demonstrated that in many diseases, and more especially those classified as zymotic (Gr. ζύμη, 'a ferment'), there are present certain vegetable micro-organisms to which the names micrococci, bacteria, and bacilli are given according to their shape, the first-named being spherical or ovoid, the other two rod-shaped. These organisms consist generally of an albuminous protoplasm, enveloped in a sheath of cellulose. It is still a matter of dispute whether they are specific or concomitant, but the weight of latter-day experience favours the former view. It seems to be established that in certain diseases these slender filaments are invariably present. Of such are the comma bacillus, or *Vibrio* of Koch, found in cholera; the *Bacillus anthracis*, found in malignant pustule, and first discovered by Pollender; the *Microsporon septicum*, found in pyæmia by Klebs; the *Bacillus tuberculosis* of Koch; and the *Bacillus diphthericus* of Löffler and Klebs, etc. Koch has shown by his experiments on rodents that micrococci may show differences sufficient to constitute distinct species, each having a specific action, and producing a special form of disease; more-

over, from differences in their habitat and nutritive requirements it may be argued that they are specifically distinct.

Bacilli multiply in two ways: either by simple transverse fission or by spore formation; they require a moderate temperature, a nitrogenous pabulum, and the admission of free oxygen for their development. The chief point of PRACTICAL interest with reference to these organisms is that, while the filaments are themselves easily destructible, the spores are highly tenacious of life, and that while the rods can only be preserved in an active state for a short time, the spores may retain their vitality for years, unaffected by ordinary changes of climate or temperature; moreover, these spores may subdivide, and, again germinating, reproduce the bacillus filaments.

It is not my desire to dilate any further on this, the theoretical side of the question. Numerous writers of much more fluent pen than mine have given us deep insight into the researches of the scientists, and every day is adding something new from the discoveries of the laboratory; but a work of this kind, no matter how practical, must touch on theory, the connection between the two branches being so intimate. The knowledge gained by the

scientific scholar is probably nowhere more necessary to the practitioner than in the study of the so-called zymotic diseases. From this germ theory have among others already sprung the discoveries of Lister, so invaluable to the surgeon, and there is every reason to hope, notwithstanding the cavils of its opponents, that through it, as time goes on, we may find ourselves able to successfully battle with diseases hitherto deadly in their effect.

I shall pass on and ask what is its bearing on the present subject. Does it not directly suggest the weapons with which to combat diphtheria? We must kill the germs of this disease; we must arrest their further development; we must in every way antagonize the poison wrought on the system by their noxious agency. Our measures must be preventive and curative. The rapid strides made in sanitary science leave room for hope that, distant though the day may be, there will come a time when contagious and infectious diseases will be few and far between. To the custodians of the public health must be left for the most part the preventive measures; but we, the practitioners, must give a helping hand. With us lies, in the first place, isolation. We must further see, among other things, to the

sanitary arrangements and precautions which directly surround the patient, give instructions to the nurses and attendants, and see that all the little technicalities, which are too well known to require mentioning, are carried out. With us lie entirely the curative means, and we must decide what are the simplest, most effective, and safest remedies. As the most numerous, and probably the most severe, cases we meet are among children, we must be directed in our treatment accordingly.

I need not again enter into general remedies, for they can all be summed up as 'nervine tonics,' but among the vast number of germicides, I do not think many will completely answer our purpose. Serious objections may be made to the majority of them. Take for instance corrosive sublimate, a most valuable germ-destroyer; still, there is considerable risk attached to the use of a solution sufficiently strong to be effective. Again, many are too caustic in their action, and in destroying the germs there is a possibility of injuring the adjoining tissues. But here I shall hold; as I have said, I do not wish to condemn the remedies of other practitioners: the position I stand in is, (1) to attempt to defend my own treatment, (2) to see that it fulfils the necessary

requirements, and (3) to point out its advantages.

To begin with No. 3. I may dismiss it in a few words. The advantages *per se* have been already mentioned, and to enter into comparison with others might lead me into criticism hostile thereto, and this I desire to avoid.

No. 1 also may be briefly dealt with. My whole article may be said to have been a long defence. I have tried to explain my own theory, and as far as possible to justify it, and acting on the assumption of its correctness, I have shaped my treatment accordingly; if, therefore, it fulfils the requirements, I hope that I have done all that is necessary.

What are the requirements? We have present in this disease a micro-organism, which carries on its deadly combat with a two-edged sword, one destroying by suffocation, the other by poison. To destroy the bacillus might be a simple undertaking if we could always reach it, but it has been proved that the Klebs-Löffler bacillus is to be found only in its growing active condition in the middle and deeper layers of the mucous membrane. Those bacilli which reach the surface of the false membrane are, for the most part, harmless. Hence the failure of the

majority of the local applications. It will from this be readily seen that, to ensure success, we must choose something which will penetrate to the seat of the organism. On this account the plan adopted by Dr. Seibert, of New York, is highly to be commended. He has invented a syringe armed with a series of fine hollow needles, with which he pierces both false and mucous membrane, and injects chlorine water, with the object of destroying the bacilli and pyogenic cocci, and has, I believe, met with considerable success by this treatment.

I will now endeavour to point out how my treatment fulfils the requirements. First as to the drug itself. Sulphurous acid is a well-known germicide. Dr. Sidney Ringer says: 'It is a potent poison to the lower forms of life; it arrests fermentation by destroying the minute organisms which determine the process; it disinfects by destroying the micro-organisms that propagate contagious diseases.' Mr. Lennox Browne says, in speaking of the treatment of diphtheria: 'It [sulphurous acid] is an efficient germicide, which acts both systemically as well as locally.' Dr. Lauder Brunton declares 'that a solution of sulphurous acid 1 in 2000 will destroy the developed bacteria. Professor William Whitla, of Belfast, says,

‘Sulphuretted hydrogen acts as a powerful germicide,’ and so on, but to Professor Polli, of Milan, is due the honour for his investigations into the action of the sulphites. He asserts (quoted in Waring’s ‘Manual of Therapeutics’) that ‘taken internally, in their passage and decomposition in the system, they become possessed of all the properties of free sulphurous acid, and by a series of experiments on dogs he proved that the sulphites had the power sometimes of entirely preserving the animal from morbid influences, and at other times of modifying the attack.’

In the face of such powerful testimony, what more suitable remedy can be found for our requirements? It is not in the power of a practitioner to PROVE in what way the sulphites act on the germ, but I would suggest that either, owing to their deoxidizing qualities, they destroy it; or that, coming into contact with the probably acid secretion from an inflamed and decomposing surface, they evolve sulphurous acid; or, as Professor Polli contends, ‘they act by modifying the aggregation of the material components of the organical structure, rendering it by their presence incapable of being acted upon by those catalytic germs.’

I have chosen sulphite of magnesium instead

of the other alkaline sulphites, because it is but slightly soluble, is the least easily altered by the air, is the most active, and has a more diuretic effect, thus assisting to eliminate the poison. By using it in the form of a pure and dry powder, it adheres to the moist mucous membrane, and, owing to its comparative insolubility, its action is carried on more slowly and CONTINUOUSLY, so that not only are any germs which are present destroyed, but those which are subsequently developed are also immediately put an end to.

Again, diphtheria bacilli are said to have been found in the spleen and other remote parts of the body, even in the muscles of the heart, therefore it is all-important to endeavour to make the treatment systemic as well as local, and this requirement I believe I have met by the internal administration of the drug in the form of 'tabloid,' the object being to rapidly and effectually saturate the system with *pure* sulphurous acid, which is non-irritating and rapidly diffusible, the ordinary sulphurous acid solution of commerce invariably containing sulphuric acid owing to its rapid oxidation, and, unlike that developed from pure magnesium sulphite, being intensely irritating. Yet one more requirement—to locally treat the bacillus

when it attacks the larynx, so as, if possible, to avoid the necessity for any such operations as tracheotomy. This has been met by the adaptation of a laryngeal tube to the insufflator, with which I hope the required object may be attained.

I hope I have now shown that the position on which I took my stand is secure; that I have defended the treatment, seen that it fulfils the requirements, and pointed out its advantages.

Let it not be imagined that I consider this treatment to be a panacea for all cases of sore-throat. Quite the contrary. I believe it is useless unless there is sepsis, and on that account I look on it as a most valuable aid to differential diagnosis. In obscure cases of tonsillitis, where we cannot exactly say whether the case is septic (including diphtheritic) or otherwise, the insufflator is almost an infallible guide. Powder the throat with magnesium sulphite, and, if the case is septic, the patient will express relief within five minutes, if otherwise no benefit is realized.

There is a class of suppurative tonsillitis which, of all others, resembles at the onset diphtheria, viz., when the soft palate is also considerably engaged, and the pus invariably

points at the soft palate. In them the inflammatory signs are very diffuse, and there is a foul discharge coating the tonsil and soft palate. Here considerable doubt may arise in the mind of the physician as to whether the affection is septic or not; but it will soon be elucidated by the use of the insufflator. Moreover, as there is always a possibility of a simple case of tonsillitis becoming a suitable medium for the incubation of the diphtheria bacillus, we shall err on the right side by the employment of magnesium sulphite.

Professor Löffler, at the International Hygienic Congress at Budapest, is reported to have stated that the diphtheria bacillus could be present in the nose or larynx of healthy persons without producing the symptoms of the disease. How important is it, therefore, to treat *all* cases of sore-throat with a safe and sure antiseptic, which will not fail to destroy the diphtheria organism, which, from this statement, may at any time be lurking in ambush!

Adverse criticism was in some quarters passed upon the first edition of my little treatise because I did not give statistics. I purposely avoided doing so, for they are at best unreliable, and undoubtedly dry reading. Again, the

success that has attended this treatment was unexpected by me, and I did not at first keep a careful record. Moreover, it is only of late that bacteriological laboratories have been opened in this country to admit of verification of our diagnosis. Therefore it would be impossible for me to make any statement in a form which would satisfy myself or my readers. As far as I can calculate, I have attended more than 150 cases by this method, in which membrane was present, and probably about 100 more which were undoubtedly septic. Beyond this I am unable to state definitely, but as all without exception recovered, the result as regards the percentage of mortality differeth not. A great number of the former were unmistakably true diphtheria, as proved by other concomitant circumstances.

I have already mentioned some of my cases, but a few more which were of special interest may be briefly sketched.

F. P——, aged sixteen, was first seen by me at 6.30 p.m. on June 29, 1893. He was lying in a semi-conscious state, scarcely able to breathe or articulate. On looking into his mouth, a large flap of diphtheritic membrane, detached anteriorly from the palate, was seen hanging down on his tongue, completely obscuring the

fauces like a curtain. When this was removed by a spatula, the throat was perceived to be covered with the characteristic chamois-leather coating. Under the treatment that I advocate he was convalescent on July 3 (*i.e.*, five days inclusive).

A. W——, aged thirty, when first seen was so prostrated that she was unfit to sit up in bed to permit of her throat being examined, and I feared a fatal result from asthenia, nevertheless I was able to cease attendance on the eighth day.

W. B——, aged three. This was a highly interesting case, an only and spoilt daughter with a very severe attack of diphtheria, in which the pharynx, uvula, tonsils, and posterior nares were all implicated. Notwithstanding almost insuperable difficulty in having the treatment carried out, she made a splendid recovery, but she was fourteen days under treatment, a fact to be entirely attributed to the circumstances mentioned.

J. S——, aged three. Another severe case, a good deal similar to the last except in that recovery took place in five days.

A. L——, aged eighteen. On the third day the membrane was cast off *en masse*—as described, like the split skin of an onion.

I might relate forty or fifty more such cases, but there would be nothing gained. Suffice it to say that I always expect to find all trace of membrane dispersed on the fourth day, *i.e.*, in seventy-two hours from the commencement of treatment, and I am rarely disappointed.

To let my readers clearly understand the treatment, I will run through one of my cases.

C. T——, aged twelve, was first seen by me on February 2, 1893, at 10 a.m. He complained of tiredness, wished to remain in bed, but could not tell why; had slight headache, pains in limbs, but throat in no way complained of until interrogated on the subject, when he said it was troubling slightly. On examination submaxillary glands were found enlarged and doughy, temperature $100\cdot4^{\circ}$. Suspecting mischief, the throat was examined, when characteristic secretion and membrane were found. The throat was *freely* insufflated. By 'freely' I mean that about the sixteenth part of an inch deep of powder should be dusted all over the surface of the mucous membrane, wherever the diffuse redness extends. Twelve tabloids, containing each five grains of magnesium sulphite, were prescribed, with directions that they were

to be sucked constantly, and saliva swallowed. Chlorate of potassium and iron internally. Nourishment (milk and beef-tea, etc.) to be administered *ad lib.*, but in frequent and small quantities. I prohibit nothing, except solid meat. Carpet ordered off the floor, disinfectants, including Eucalyptia, sprayed about the room by means of an atomiser, and Condy's fluid in vessels about the room. At evening visit there was considerable improvement. Throat insufflated again.

February 3.—Morning, temperature 99.8° ; throat clearing; insufflated. Same directions as to food, etc. Evening, throat almost clear.

February 4.—Throat clear. From this on, a steady recovery.

This is the routine carried out by me in all cases with slight variations, as the exigency and severity of the symptoms demand. The most powerful argument that I can make use of in favour of this treatment is that, whereas prior to its discovery a very large percentage of those that I attended suffering from diphtheria expired, since its introduction not one case attended by me, and treated on this principle, has ended fatally; and that in six years' time (during the most of which an epidemic of

diphtheria has been ruling in London) I have only had two cases of laryngeal diphtheria speaks volumes as to its power of aborting the affection. I avoid the word 'prophylactic' intentionally, it being my opinion, as I have said, that diphtheria may, and probably does, exist before the membrane is found, the bacilli carrying on their deadly warfare in the layers of the mucous membrane, before the formation of the exudation patch and subsequent necrosis.

Since the issue of the first edition, several medical men have kindly forwarded to me results of cases treated by them by this method, and the success achieved appears to be a strong corroboration both of the efficacy of the treatment and also of the views I hold about the disease itself.

Surgeon Wheeler, ex-President, Royal College of Surgeons, Ireland, reports six cases. All recovered.

Dr. P. Gowan, nine cases. All recovered.

Dr. Keele, four cases. All recovered.

Dr. Ling, fifteen cases. All recovered.

Dr. Niall, sixteen cases. One died, remainder recovered.

Dr. Brabant, four cases. One died, three recovered.

Dr. Houchin, five cases. One died, four recovered.

It will be seen that, out of fifty-nine cases, only three terminated fatally, but of these Dr. Houchin reports that his case expired in a few hours after having been seen; also Dr. Brabant says that his case was a hopeless one of laryngeal diphtheria in a child on whom tracheotomy had been performed; Dr. Niall, too, states that, when his case (which was that of a delicate strumous child) was recovering from pharyngeal diphtheria, the disease suddenly appeared in the larynx, and the child quickly sank. I feel very grateful to those who have already sent me their results, and I sincerely trust that others will be equally obliging, so that at some future date I may be in a position to return more reliable and satisfactory statistics.

I should be guilty of deep ingratitude if I were to lay down my pen without returning my sincere thanks to the firm of Messrs. Burroughs, Wellcome and Co. When I, a perfect stranger, laid my views before them, they gave me every assistance in their power; they made investigations for me in their laboratory; manufactured for me a *pure* powder and 'tabloids' of sulphite

of magnesium ; constructed an insufflator, and have now adapted thereto, at my suggestion, a furcate throat-tube and a laryngeal tube, with the latter of which I hope it may be possible to apply the drug locally to the larynx when necessary.

APPENDIX.

THE following case which has just occurred seems worthy of record: On Wednesday, January 16, 1895, my friend, Dr. F. F. Moore, of Mill Hill Park, came to ask me to attend, in consultation with him, a child (Miss N——), aged five, whom he strongly suspected to be suffering from diphtheria. On the previous Sunday, when called to this child, he found a slight membranous patch on one tonsil, which kept spreading daily; and on the morning of the 16th he found that the other tonsil was engaged, so he wished me to see it. I visited with Dr. Moore at 4 p.m. that day, and found the following condition: Tonsils, uvula, soft palate, and pharynx were completely covered with membrane, which appeared to be certainly diphtheritic. In order to leave no doubt, I inoculated with some of the exudation a tube of sterilized blood serum obtained from the Clinical Research Association, and sent it off

for bacteriological examination by their experts ; and the result of their investigation proved that 'the culture contained large numbers of typical colonies of diphtheritic growth, and that a few streptococci were associated with the bacilli.' I then insufflated the throat, and Dr. Moore kindly did so three or four times daily, and had the tabloids administered between whiles. When I called on Friday (two days after) I found that the membrane had disappeared with the exception of a patch on one tonsil much smaller than a threepenny piece, and on Sunday the throat was perfectly clear, and the child was singing and playing about the room.

I would call attention to the facts that both diphtheria bacilli and streptococci were present, making the case more serious ; again that the recovery was so speedy ; and again that no internal medicine of any kind was given, with the exception of the tabloids, to which and the insufflations, I think, I may claim that the cure is to be attributed.

THE END.

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