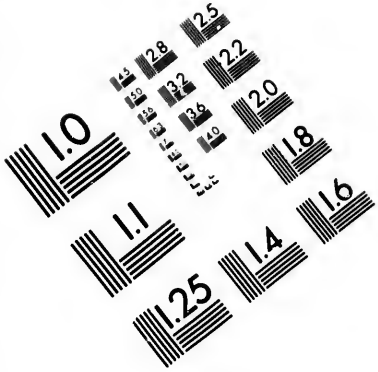

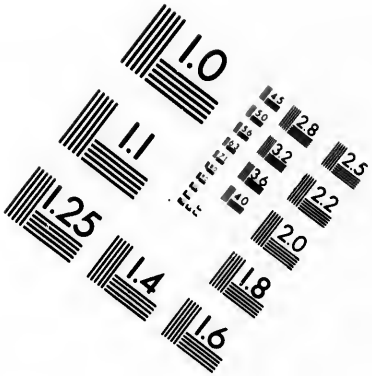

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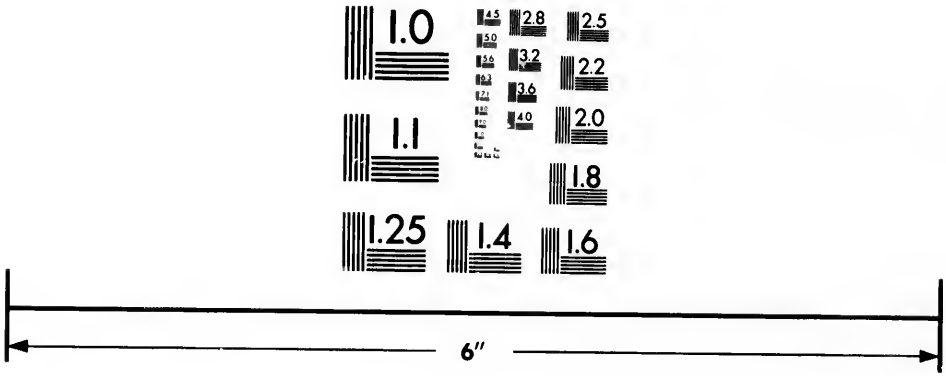

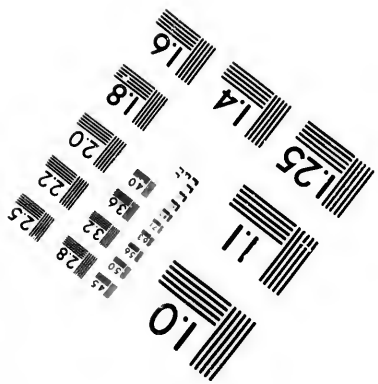

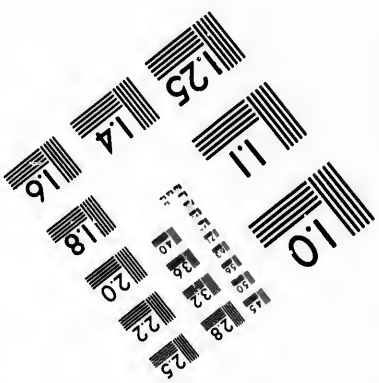

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CASE OF DIPHTHERIA.

ACUTE LARYNGEAL SYMPTOMS—TRACHEOTOMY—RECOVERY.

BY JOHN BELL, A.M., M.D.

PHYSICIAN TO THE PROTESTANT INFANTS' HOME, MONTREAL DISPENSARY, &C.

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On Monday the 24th of September last, Mrs. F., Ontario street, near St Lawrence street, called at my office with her son, two and a half years old, who had a sore throat which she feared was diphtheritic. I found he had a white membrane covering both tonsils and extending up the pillars of the fauces to the uvula. He had not been well, and, having complained of some difficulty in swallowing, the mother had that day examined his mouth and discovered the diseased condition of the back part of it. She had observed that he was feverish from the Thursday previous.

The boy is rather delicate, and last year had the measles, which was followed by a prolonged attack of bronchitis and debility. In February last, Dr. Osler and I removed from him a large cyst, containing yellowish fluid and cholesterine, situated over the sternum.

The treatment I followed consisted in the application of tincture of iodine to the diseased surface once a day, in wiping out the fauces and pharynx every hour with a mixture in equal parts of sulphurous acid and glycerine, with sulphite of soda, and in the administration of the citrate of iron and quinine.

The weather being fine, the boy was brought to my office daily until the 1st of October. No improvement in his condition took place, but rather the reverse. The area of diseased surface covered with white membrane had increased, extending over the sides of the pharynx. On the 1st of October, being out of town, Dr. Blackader kindly saw the case for me, and made a rather unfavourable prognosis, as dyspnœa had commenced. He ordered poultices to the throat, and water containing carbolic acid to be constantly boiled near the bed. This production of carbolized steam was continued for the following three weeks, and the successful result of the subsequent operation was probably largely due to its continuance. During the 2nd of October the dyspnœa increased, and brandy was added to the remedies employed. The boy's strength had, of course, been kept up by a liberal supply of meat broths and milk.

On the afternoon of the 3rd of October the dyspnœa had become so extreme that the blood was but imperfectly aërated, coma was beginning, and death was not far distant. Having been instructed to that effect the father brought word of this, and Dr. Roddick went with me —tracheotomy to be performed, if thought advisable. After finding the urgent dyspnœa, the advanced cyanosed condition, the marked diaphragmatic respiration, that the lungs were in a healthy condition, and that death would soon end the child's struggle for life, chloroform was administered and I rapidly opened the trachea. But before the tube was inserted the patient had ceased to breathe. Dr. Roddick, with characteristic promptitude and energy, performed artificial respiration while, by applying my mouth to the tube, I expelled the clotted blood with which it had become obstructed, and inflated the lungs each time Dr. Roddick raised the arms. A beautiful pink colour of the lips and skin soon took the place of the ashy purple, and the patient continued the respiration for himself. A Durham's tracheotomy tube was used, but the inner one, proving of too narrow calibre to admit sufficient air, was not used. The blood and mucus were subsequently removed from the tube by means of feathers, although the little fellow kept it pretty clear by energetically blowing

out the obstructions. A warm, moist sponge was placed over the tube and against this was constantly directed through a paper cone or tube, a current of steam from a tin tea-pot, which contained half an ounce of pure carbolic acid, in four or six ounces of water. This was continued for more than two weeks, and until after the tube was permanently removed. I watched him myself until the next morning, and am indebted to Messrs. McCorkill and Rutherford, medical students, for kind assistance in this way.

The following are jottings of the progress of the case : —

Oct. 3rd.—Pulse 120 ; respirations 40 to 50.

5th.—Pulse 130 ; respirations 36 ; temperature 100°. F.

6th.—Pulse 128 ; respirations 36. Removed and washed the tube, the patient in the meantime breathing through the incision alone, which remained open.

9th.—Is able to force a small quantity of air through the larynx when the incision is closed. The mucus from the trachea, which had become clear or white shortly after the operation, has been stained with blood for the last two or three days.

10th.—Pulse 140 ; respirations 36 ; temperature 100°.—Back and base of right lung dull on percussion ; left side quite resonant. Is able to blow more strongly through the larynx when the tube is out.

11th.—Pulse 132 ; respirations 28 ; temperature 99.2°.

12th.—Pulse 100 ; respirations 38 asleep, 26 awake.

13th.—Pulse 128 ; respirations 28 ; temperature 101.2° ; midnight, pulse 120 ; respirations 32.

14th.—Pulse 120 ; respirations 40 ; temperature 99.6°.

15th.—Pulse 120 ; respirations 32 ; temperature 99.8°. Breathes with comparative comfort through the larynx, but with considerable effort and noise, while a piece of plaster keeps the edges of the wound together. The voice is formed sometimes for an instant in his efforts to speak.

17th.—Pulse, 140 ; respirations 40 ; temperature 100°, while asleep.

19th.—Tube left out altogether. The dulness of the right lung has almost entirely disappeared—poultices, mustard plasters and an expectorant mixture having been used for it, together

with the brandy, which had been freely continued. It was almost as curious to watch this congestion run its course without a cough, as it was to see the little fellow cry piteously without a sound, and had I not watched the condition of the lungs I could not have detected the congestion from any change in the breathing, although, corresponding with it, there is a rise in the respiration rate and temperature which might, however, have been caused by other agents.

After the operation the sulphurous acid mixture was applied with less frequency to the throat, and half a teaspoonful was swallowed four or five times a day. The almost perfect freedom from all sources of irritation of the parts affected, together with the action of the antiseptic remedies, locally and through the circulation, soon arrested the diphtheritic exudation and caused its entire disappearance from the parts in sight several days before the removal of the tube. A diphtheritic patch at one angle of the mouth had also healed. The surface of the incision in the neck was for the first few days covered with a thin grayish-white layer, but this was changed to healthy granulations before the process of contraction began. The quantity of mucus emitted from the tube was at no time large, and it steadily decreased in amount and became more viscid in quality as the bronchial irritations, above referred to, declined, so that the carbolic acid inhaled could not have had any local injurious effect. The amount of carbolic acid inhaled with the steam during more than two weeks must have been great, for more than 30oz. were evaporated during that time, and about two gallons of alcohol were consumed in its evaporation. His bowels kept regular, requiring laxative medicine only once or twice during his illness, and his urine was passed freely in normal quantity.

About the 10th, his little sister, five years of age, who lived on the same flat, became ill and feverish, and well-marked diphtheritic exudation appeared over the tonsils and fauces, and extended into the posterior nares with severe coryza accompanying it. She had all along got the benefit of the carbolic acid

vapour; and tincture of iodine and citrate of iron and quinine were early used. The disease was not intense, and she was not confined to bed, but three weeks elapsed before the exudation and granular œdema of the superficial membrane had disappeared at the back of the uvula and velum palatinum.

About the 15th, the mother, who was four months pregnant, began to suffer from malaise and chilliness followed by fever and weakness. The throat was sore, and from white specks in the tonsillar crypts an exudation extended over both tonsils, being thickest on the left. She was so weak and exhausted that she was confined to bed. Quinine, iron and brandy were exhibited, and tincture of iodine was applied to the exudations. The cork having been left out of the bottle it had become stronger than officinal, and some of it having touched the velum palati and roof of the mouth of the left side, it was followed by a free exudation over the irritated parts. Subsequently the exudation was touched three or four times a day with Tilden's bromochloralum (a compound of aluminum, bromine and chlorine in various states of combination), and she gargled her throat more frequently with a solution of the same. The throat was quite well in little more than a week, and she had nearly recovered her usual health without a mishap by the end of the month.

The little boy became very thin during his illness, and continued weakly for some time after. There was considerable tendency to bronchial irritation, especially on exposure to slight draughts, and this is not yet quite gone, although his voice is almost entirely restored and his form is again well filled out, while his lips and cheeks have regained their normal colour.

If there is anything peculiar in the treatment of the foregoing case, it is in the amount of antiseptic agents that were administered to the patient in various ways and for a prolonged period. The disease itself was undoubtedly diphtheria. Had the medication anything to do with the successful result, and if so, in what way?

Croup is a local malady, (See Dr. J. L. Smith's article in *Trans-International Medical Congress*, 1876), this was a

constitutional one as shewn by the systemic infection in the formation of the peculiar membranes in other parts of the body, and also by the blood disease in the malnutrition, anæmia, and weakness which continued for a considerable time after. There can be no doubt that the sister and mother contracted the disease from this case, as neither of them were out of the house from the first of October until the disease appeared in the sister on the 10th, and in the mother on the 15th of October. They were exposed to the infection from the first, and we may justly conclude that several days were included in the period of incubation. In the mother the actual appearance of the diphtheritic condition was preceded for two or three days by severe constitutional symptoms which do not appear in simple cases of croup. The membranes in this case were not examined microscopically, so that it is uncertain whether they contained micrococci or not. After reading the elaborate array of facts advanced by Oertel in Ziemssen's Cyclopædia of Medicine, one cannot help thinking that bacteria may have something to do in the causation of this disease, although it seemed to me that he is quite as anxious to prove that micrococci are the actual cause of the disease as to find out the true nature of the materies morbi. He has not proved that the bacteria of diphtheria differ from those found in the tissues in a state of comparative health and because in this disease they appear in immense numbers, he seems to assume that they are the cause of the disease. If they are, the circumstance is unique, for we know of no other constitutional disease that is caused by the introduction into the body of a vegetable parasite. In diphtheria, as well as in scarlet fever and other constitutional diseases with local lesions, there appears to be an unusual activity aroused, by some cause, in the bioplastic elements of the blood and solid tissues. In diphtheria this happens to be accompanied by the rapid multiplication of the bacteria already existing in the tissues. These bacteria may in turn be utilized as the carriers of the infection, which, as shewn by Beale in the case of scarlatina, most probably consists of minute particles of protoplasm in a pathological state of activity, and which, like pus-cells of various kinds may

institute the formation of elements similar to themselves from the normal healthy tissues. The particles of morbid bioplasm constituting the poison or contagium of diphtheria, whether formed by self-division in the blood, or by a degenerating action on the reproduction of existing tissues, are probably endowed with a high degree of energy in a lowered plane, and with a capability of living for varying periods under extremely altered conditions. There is no limit to be set to the minuteness of these particles of materies morbi, until possibly we reach the ultimate molecule of the bioplasm, composed of certain atoms whose immediate relations to one another, under the influence of degraded vitality, may differ from those of a healthy molecule. The nature of nearly all of the poisons of the infectious diseases, including diphtheria, seems to be to lower the vitality of the tissues and set up processes tending to septic poisoning, necrosis and putrefaction.

We know that carbolic acid and other antiseptic agents have the effect of arresting the formation and multiplication of pus cells and bacteria, and probably also of other histological elements in a lowered plane of vitality, in which might reasonably be included the morbific matter which constitutes the contagium of diphtheria and other allied diseases. On the supposition that the contagium of diphtheria is of the nature, either of living substance, bioplasm in a pathological condition, or of a physico-chemical poison tending to the extinction of the vital force and disintegration of the component molecules of the tissues, the use of carbolic acid, as antagonistic to its life or action, seems to be preferable to that of many other antiseptics, inasmuch as it may be introduced into and retained in the system in an unaltered form, as was done in the case which forms the subject of this paper. I have since used carbolic acid in steam as an adjuvant in the treatment of several cases of typhoid fever, one of which was complicated by a diphtheritic condition of the nares and pharynx with commencing septicæmia, and in each case the practice was satisfactory, as evidenced by the state of the mouth and pharynx, together with the general condition during treatment, and the ultimate result.