

## **Lobar pneumonia as a complication of diphtheria / by J.D. Rolleston.**

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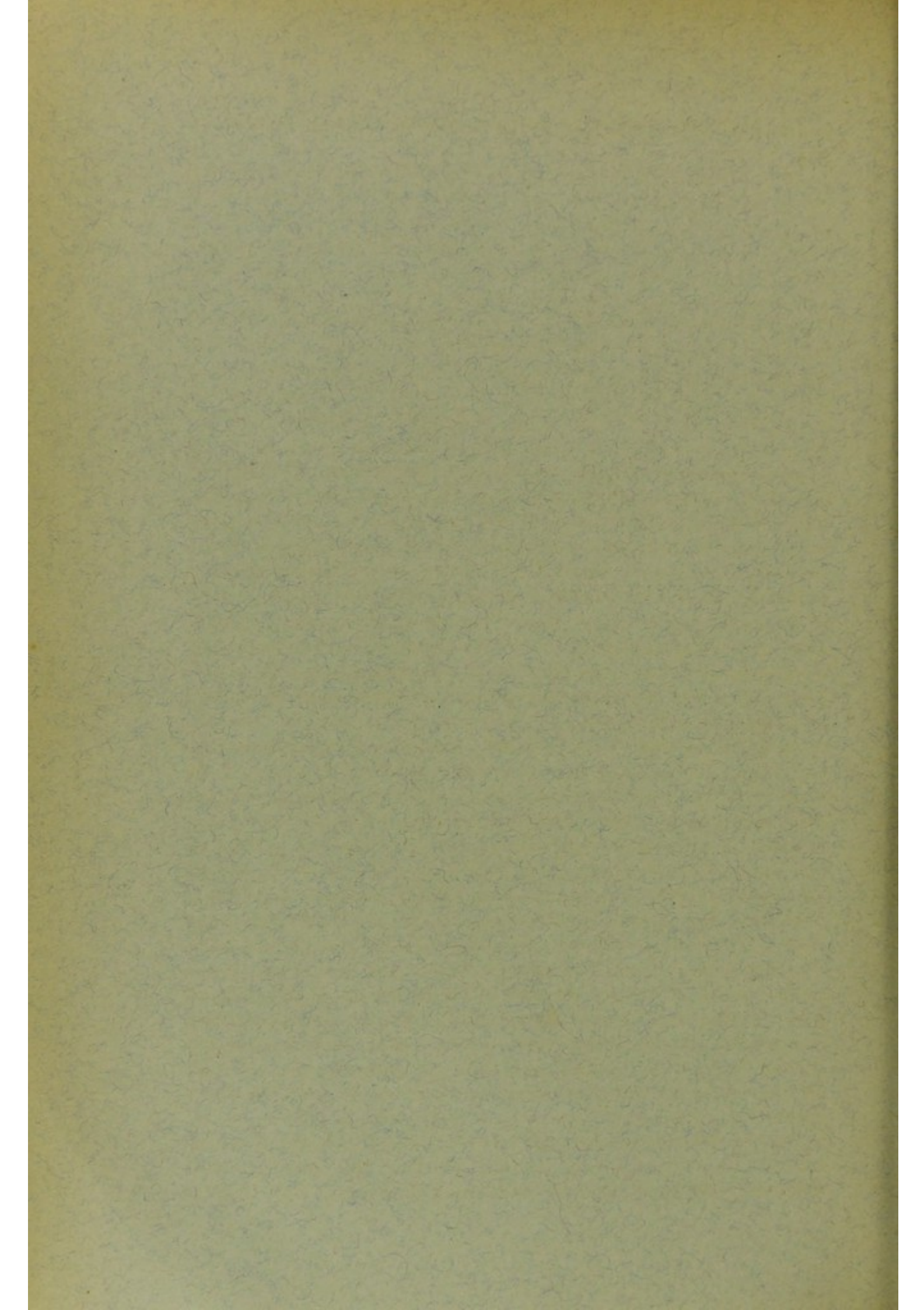
**LOBAR PNEUMONIA AS A COMPLICATION OF  
DIPHTHERIA.**

By J. D. ROLLESTON, M.A., M.D.Oxon.,

Assistant Medical Officer at the Grove Fever Hospital of the Metropolitan Asylums Board.











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By J. D. ROLLESTON, M.A., M.D.Oxon.,

*Assistant Medical Officer at the Grove Fever Hospital of the Metropolitan  
Asylums Board.*

THE occurrence of lobar pneumonia in the course of diphtheria has always been regarded as an exceptional event. The earlier writers, such as Barthez and Rilliet, and Cadet de Gassicourt, stated that the pneumonia which complicated diphtheria was always of a lobular form. Sanné (1877) is the only authority who has declared that this complication is other than a rarity. It occurred in 48, or 3·2 per cent., of his 1500 cases of diphtheria. Most of these cases were laryngeal. Only four recovered. This high mortality was explained by the co-existent bronchial lesions. In sixteen cases there was membranous bronchitis, in ten cases there was co-existent broncho-pneumonia.

A. Broca, writing in 1885, thinks that Sanné exaggerated the frequency of lobar phenomena in diphtheria, and that many of the cases described as lobar were really broncho-pneumonia. On the other hand, so far from disputing the occurrence of lobar pneumonia in diphtheria, he relates a case of his own in a girl, aged 13 years, who developed diphtheria three weeks after measles. Laryngeal symptoms occurred, necessitating tracheotomy. Lobar pneumonia supervened, and later paralysis of the palate and cycloplegia. Ultimately recovery took place. Broca also quotes a case of Lange in a girl, aged 16 years, in whom death occurred on the sixth day. Post mortem, in addition to membrane in the pharynx and bronchi, right lobar pneumonia was found. Bokai, in 1889, records the case of a boy, aged 8 years, who after tracheotomy developed right hemiplegia and three successive attacks of lobar pneumonia. The lung condition was regarded by Bokai as purely accidental.

Recent writers, *e. g.* Ruault (1899), Goodall (1900), Northrup (1902), Deguy and Weill (1902), Sevestre and Martin (1904), Biernacki (1904), Welch and Schamberg (1905), and Osler (1905),



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are agreed as to the rarity of secondary lobar pneumonia in diphtheria.

The statistics of the Metropolitan Asylums Board hospitals for the last seven years out of an annual average of 6470·7 diphtheria patients give an average percentage of 0·38 cases of lobar pneumonia, or a total of 167 cases, as compared with an average percentage of 1·12 for broncho-pneumonia, or a total of 507 cases during the same period. Incidentally it may be remarked that diphtheria in this respect offers an interesting contrast with enteric fever, in which the incidence of lobar and broncho-pneumonia is reversed. Thus the average percentage incidence of these two complications of enteric fever at these hospitals during the same period of seven years has been 2·33 and ·98 for lobar and broncho-pneumonia respectively.

The present paper is based on observations made on 1000 consecutive cases of diphtheria that have been under my care at the Grove Hospital in the course of the last four years. Lobar pneumonia occurred in only seven cases (0·7 per cent.). All the patients were children, their ages ranging from  $1\frac{1}{12}$  years to 7 years. As 266 of the total number were above the age of 7 years childhood appears to be a predisposing factor; three of the patients were males, four were females. With two exceptions, which occurred in June and July respectively, the cases were all met with in the winter months, *viz.* two in December and one in each of the months of November, January, and February. Only three (42·3 per cent.) were cases of laryngeal diphtheria, two requiring tracheotomy; of the remainder three were of a severe faucial type, and one, the most typical, was a mild faucial case. In each of the three severe faucial cases some form of paralysis occurred. It is noteworthy that in fifteen cases of broncho-pneumonia that occurred among my 1000 cases nine, or 60 per cent., were found in laryngeal cases, seven of which were tracheotomised.

*Date of onset.*—With one exception, which took place in the ninth week, all the cases arose within the first ten days of the disease. In three cases the pneumonia developed before the throat became clean. In two cases the membrane disappeared from the throat on the same day as the pneumonia occurred. In the remaining case the throat had already been clean six days.

*Mode of onset.*—In three the onset was abrupt, occurring after the subsidence of the initial pyrexia; in the remaining four the initial pyrexia had not yet subsided, but was increased by the supervention of the lung condition.

*Site.*—The pneumonic process showed a predilection for the right



lung, especially for the lower lobe. In five the right lower lobe alone was affected, in one the lower lobes of both lungs, and in one the right upper lobe alone.

*Symptoms.*—Vomiting occurred in one case. Pain was complained of in two cases, in one in the chest, in the other in the abdomen. Nocturnal delirium was noted in three cases. Herpes labialis was seen in three cases. A short cough with an expiratory grunt was present in all. Otherwise the respiratory symptoms were not obtrusive, being not out of proportion to the temperature as is the rule in broncho-pneumonia.

The duration of the pyrexia varied from four to twelve days, the average time for the seven cases being 6·2 days. In one case only the temperature fell by crisis, in the rest defervescence occurred by lysis. The striking anomalies of the temperature curves which are seen in the annexed charts are to be explained partly by the influence of the primary disease, partly by the age of the patients.

The influence that a primary disease has on the course of pneumonia complicating it, was well known to the earlier writers. Thus Wunderlich, writing in 1871, says: "Secondary croupous pneumonia sometimes follows an identical course with that of the primary, but in other cases exhibits more or less deviations from such a course." Similar remarks were made by Rilliet and Barthez in 1884, and authorities of to-day hold the same language. Thus Osler says: "The symptoms of the secondary pneumonias often lack the striking definiteness of the primary croupous pneumonia."

The physical signs were, as a rule, much more obvious than the symptoms, thus offering a striking contrast to broncho-pneumonia, in which, especially after tracheotomy, the presence of consolidation of the lung may often be difficult to determine. In all the cases there was a marked absence of concomitant bronchitic or pulmonary lesions, to the presence of which was due the fatality of Sanné's cases. Pleurisy was present in three cases, one of which (Case 5) subsequently developed empyema.

*Diagnosis.*—The initial pyrexia of diphtheria is usually of short duration, and rapidly tends to fall after the injection of antitoxin. A sudden rise as shown in Charts 1, 5 and 6, or an exacerbation of the initial pyrexia (Charts 2, 3, 4, 7) should therefore draw special attention to the condition of the lungs.

The occasional though rare occurrence of lobar pneumonia in measles, which has been noted by Broca and Sanné, and more recently by von Jürgensen and Bottomley, affords an interesting parallel. Jürgensen says that the whole question is yearly becoming



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more and more complicated, and suggests that the diagnosis of lobar pneumonia can only be settled by the absence of a wide-spread capillary bronchitis. It has already been stated that there were no signs of concomitant bronchitis in my cases.

*Prognosis.*—How much more favourable is the prognosis of lobar pneumonia as compared with broncho-pneumonia is illustrated by the fact that whereas none of the seven cases proved fatal, only three of the fifteen cases of broncho-pneumonia among my 1000 cases of diphtheria recovered, thus constituting a mortality of 80 per cent.

*Treatment.*—No special treatment was required differing from that employed in primary lobar pneumonia.

*Pathogeny.*—The rarity of lobar pneumonia in diphtheria suggests that its occurrence is but a fortuitous one. Baginsky in particular regards it as an entirely accidental complication. Against this view must be weighed (1) its predilection for children, (2) its occurrence at an early stage of the disease.

Both these facts seem to indicate something more than a mere coincidence. The absence of fatal cases prevents me from suggesting a more satisfactory reply.

It is well known that children as a rule have no sputum, and even if it be obtained, as Variot suggests, by titillation of the fauces, the mere presence of diphtheria bacilli in such a specimen would by no means indicate that the pneumonia was due to the Klebs-Loeffler bacilli.

The characteristics of lobar pneumonia as a complication of diphtheria may be summarised under the following four heads:

(1) Lobar pneumonia as a complication of diphtheria is a rare event.

(2) It is not, like broncho-pneumonia, the special appanage of laryngeal cases.

(3) It occurs only in children.

(4) It resembles the primary lobar pneumonia of children in being atypical in the following respects: absence of expectoration and of marked respiratory trouble, in an occasionally remittent or even intermittent pyrexia, in the frequent occurrence of lysis, in its relative benignity, and absence of any sequelæ except empyema.

CASE 1.—A boy, aged 4 years, was admitted October the 8th, 1903, on the fifth day of an attack of severe faucial and nasal diphtheria. Eighteen thousand units of antitoxin were injected on admission. The throat became clean on the eighth day. Albuminuria was

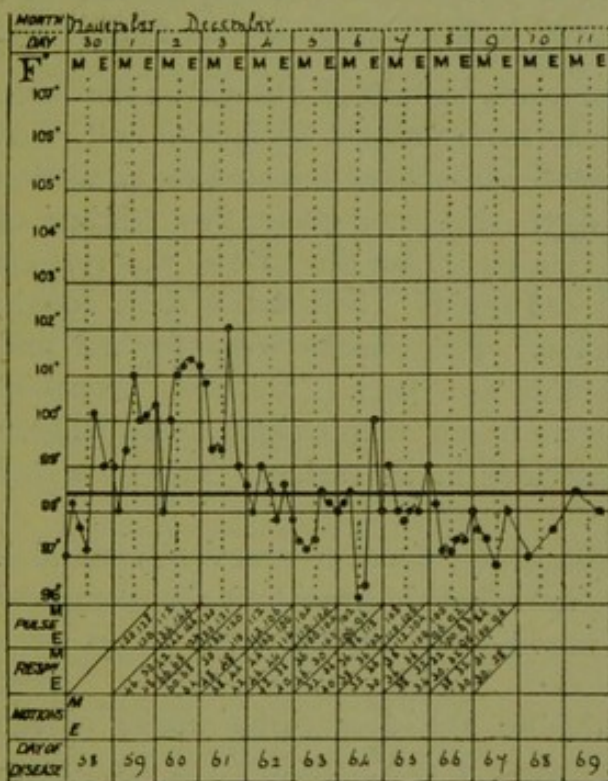


present from admission till the ninth day. Palatal palsy and cycloplegia developed on the fourteenth day and lasted till the sixtieth.

Catarrhal jaundice occurred on the sixteenth and lasted till the twenty-first day of the disease.

The temperature, which was  $101^{\circ}$  F. on admission, reached normal the following day, and remained so till November the 30th, when it rose to  $100.2^{\circ}$  F. On December the 1st, dulness, bronchial breathing, and bronchophony were detected in the lower part of the

CASE 1.



CASE 2.



right axilla and at the right base. The child passed a restless night and was delirious. The next day the signs in the chest remained the same. The cheeks were flushed, there was a short hard cough and marked deficiency of chlorides in the urine. The following evening the temperature fell abruptly. The signs in the chest gradually cleared up, so that by December the 11th nothing abnormal in the lungs could be detected. The boy was discharged in good health on December the 21st, the seventy-ninth day of disease.

CASE 2.—A girl, aged 7 years, was admitted on November the



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14th, 1903, on the fifth day of a severe attack of faucial diphtheria. Eighteen thousand units were injected on admission and on each of the two following days, and she was given five minims of adrenalin chloride solution four hourly. On November the 16th, the seventh day of her disease, a patch of impaired resonance with bronchial breathing was found in the right lower lobe. Cough was troublesome and there was some cyanosis. On November the 18th the membrane had left the throat. The temperature subsided by lysis to normal on November the 20th, and the following day the lungs were clear. Albuminuria lasted from the tenth to the twentieth day, and paralysis of accommodation from the twenty-eighth to the fifty-second day. The patient was discharged in good health on January the 25th, 1904.

CASE 3.—A boy, aged 7 years, was admitted December the 14th, 1903, on the fourth day of a very severe attack of faucial and nasal diphtheria. Twenty-one thousand units were injected on admission and again on the following day. He was given five minims of adrenalin solution four hourly. On December the 15th he was restless in his sleep and his respiration was rapid. There was a short cough, but not frequent nor troublesome. The cheeks were flushed and there was some working of the alæ nasi. Dulness, bronchial breathing, and bronchophony were found at the right base. There was a marked deficiency of chlorides in the urine. The next day the right base was more dull.

The following day the temperature became practically normal. There was no longer any bronchial breathing nor bronchophony and many redux crepitations were heard. By the 23rd the lungs were normal.

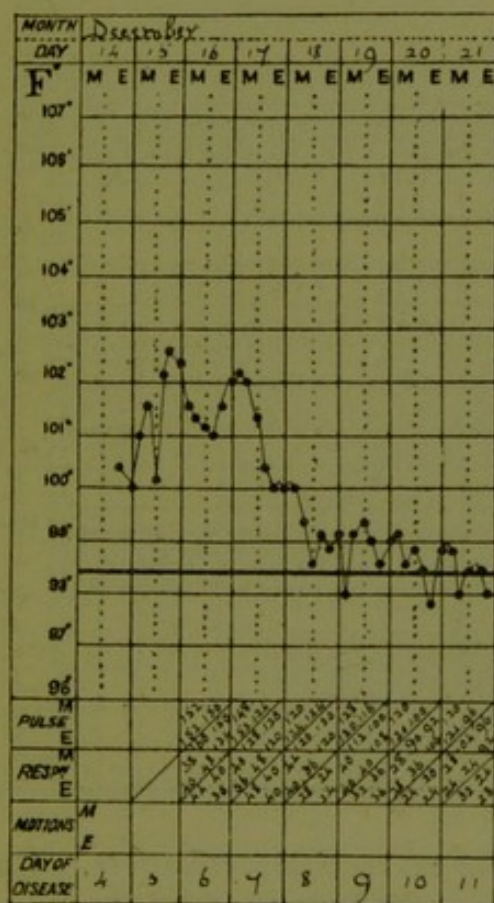
Albuminuria was present during the first three weeks of the disease and paralysis of accommodation was present from the thirty-first to the fifty-first day. No other complications developed, and the boy was discharged in good health on February the 4th, 1904.

CASE 4.—A girl, aged  $1\frac{1}{2}$  years, was admitted February the 26th, 1904, on the eighth day of an attack of mild faucial but severe laryngeal diphtheria. Eighteen thousand units were injected on admission, and again on the following day. Tracheotomy was performed under chloroform on February the 27th. The same evening the relief which had followed the operation was replaced by restlessness. The tube was removed and after rather prolonged exploration of the trachea a large branching cast was expelled. On February the 28th the throat became free of membrane. Respiration was still rapid and there was slight impairment of the percussion note between the

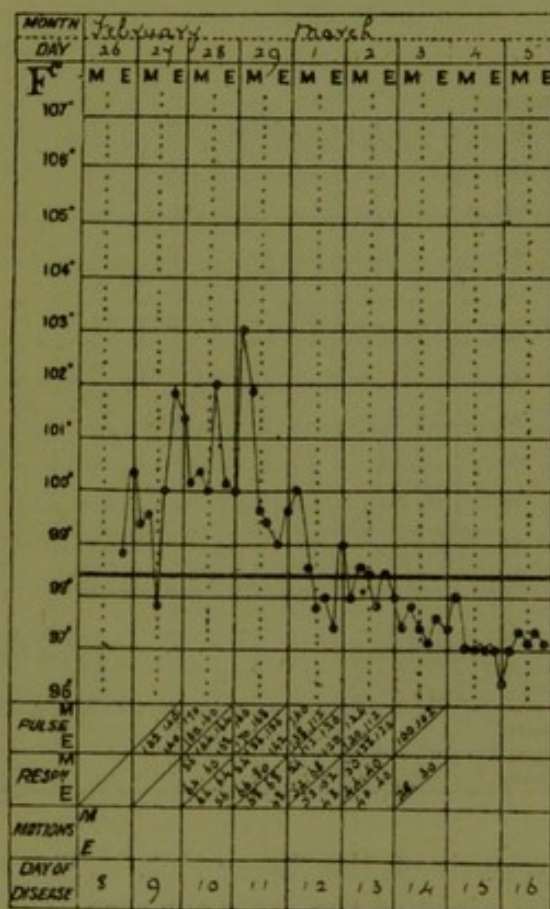


vertebral border of the right scapula and the vertebral column. On February the 29th there was definite dulness with bronchophony in this situation, and there was marked deficiency of chlorides in the urine. On March the 1st the tube was left out. There was still consolidation of the right upper lobe. Resolution commenced the next day, and on March the 5th the lungs were normal. No further complications ensued, and the child was discharged in good health on April the 4th, 1904.

CASE 3.



CASE 4.



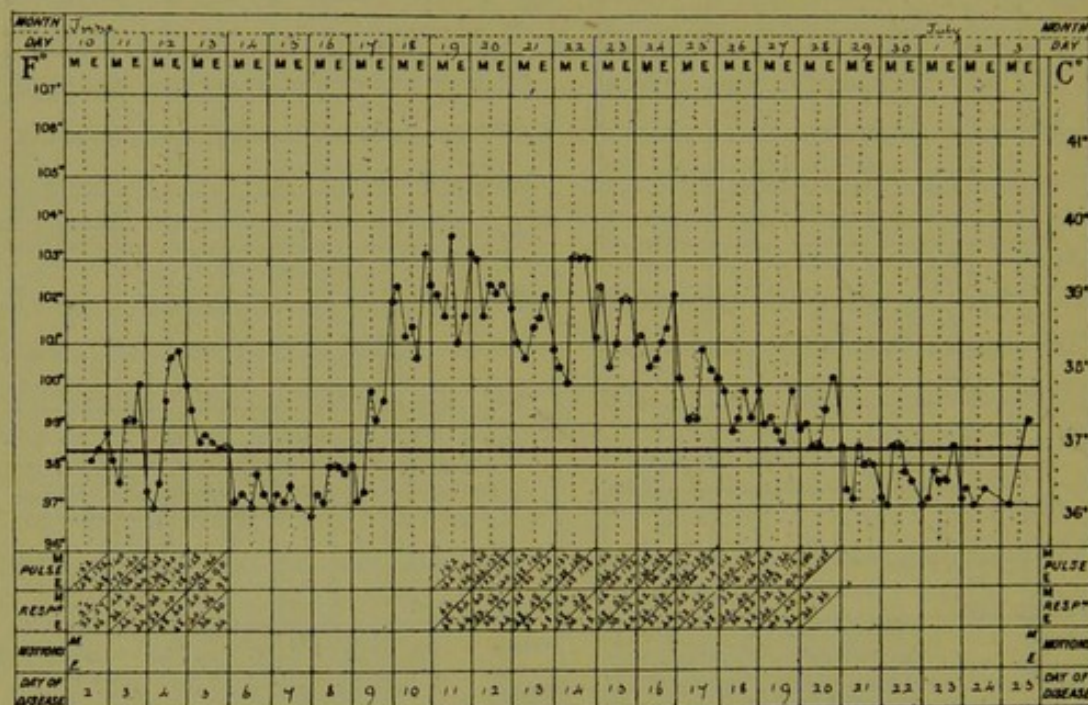
CASE 5.—A girl, aged 5 years, was admitted June the 10th, 1904, on the second day of an attack of mild faucial and severe laryngeal diphtheria. Tracheotomy under chloroform was performed on admission. During the following two days violent dyspnoeal attacks occurred, for which no mechanical cause could be found. The throat became clear on the 12th, and on the 14th the tube was left out. The temperature reached normal on the same day and remained so till the 17th, when it rose suddenly to 102° F. The child was very fretful and passed a restless night. It was not till



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the 19th that any signs in the chest were discovered. A large patch of consolidation was then found in the right lower lobe. The respiration was rapid and accompanied by an expiratory grunt. From the 19th to the 21st serum urticaria was present on the trunk and limbs. On the 20th the red border of the upper lip was covered by an eruption of herpes. Small clusters of vesicles were also present just below the right corner of the mouth and over the right malar bone. The whole of the lower lobe of the right lung was now solid, and a small patch of consolidation was also found at the left base. The facial colour was good, but there was slight

CASE 5.



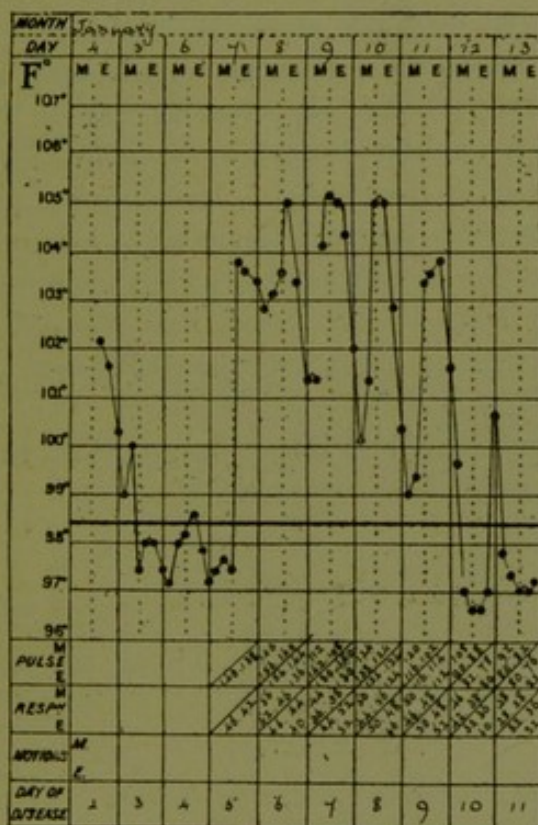
cyanosis of the finger tips. There was no respiratory distress. On the night of the 22nd she was delirious. On June the 23rd the pulse was weak and the heart sounds were obscured. She was given strychnine gr.  $\frac{1}{60}$  four hourly hypodermically. On the 25th signs of resolution in the lungs were detected and the temperature began to fall. The strychnine was reduced to eight-hourly doses, and was omitted next day. After an apyrexial interval of four days the temperature began to rise again. Owing to the impairment of resonance and weakness of breath sounds at the right base an exploratory puncture was made and some turbid fluid was removed. The following day an operation for empyema was performed, and about 1 oz. of perfectly sweet pus evacuated. The temperature subse-



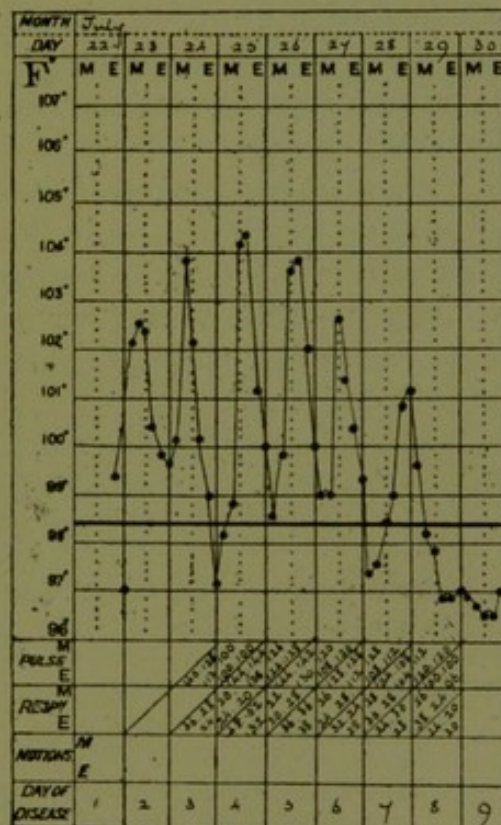
quently remained practically normal. By August the 25th the wound had perfectly healed, and the child was discharged on August the 28th, after eighty days' residence in hospital.

CASE 6.—A boy, aged  $5\frac{1}{2}$  years, was admitted January the 4th, 1905, on the second day of a mild attack of faucial diphtheria. Twelve thousand units were injected. A trace of albumin was present in the urine, which lasted till January the 13th. The throat became clean on the fifth day. The same evening he complained of headache and pain in the left hypochondrium. The skin was

CASE 6.



CASE 7.



pungently hot, and there was slight cough. No physical signs could be detected on examination either at 5.45 p.m. or 10.45 p.m. The following day there was decided impairment of resonance in the right axilla and right base, where pleural friction and fine crepitations could be heard. The cough was rather troublesome. A mixture of ipecacuanha and squills was therefore given three hourly. On the 11th definite bronchial breathing could be heard below the inferior angle of the right scapula. There was some serum urticaria on the abdomen. The temperature fell by crisis on the tenth day, and after a slight rise the following night remained



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normal till January the 15th, when there was pyrexia of five days' duration associated with circinate erythema due to serum. By January the 25th the signs in the chest had quite cleared up, and the boy was discharged on February the 14th after a stay in hospital of forty-one days. No paralysis of any kind developed in this case.

CASE 7.—A girl, aged  $3\frac{1}{2}$  years, was admitted to hospital on July the 22nd, 1905, on the first day of an attack of mild faucial and laryngeal diphtheria. A thick cloud of albumin was present, which lasted till the tenth day. Twelve thousand units were injected on admission, and the throat became clean on July the 26th.

On July the 24th she complained of pain in the abdomen and vomited after her feed. Respiration was not markedly accelerated, but there was a slight cough. There was definite impairment of resonance, fine crepitations, and friction heard below the spine of the right scapula. The next day bronchial breathing was heard in this situation, and herpes of the upper lip developed. Resolution commenced on the 28th, and by August the 7th the lungs were normal. Beyond serum urticaria, limited to the injection site, which occurred on July the 29th, no further complications developed, and the child was discharged on September the 7th, 1905, on the forty-eighth day of disease.

I am indebted to Dr. J. E. Beggs, Medical Superintendent of the Grove Hospital, for permission to publish these cases.

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