A Thesis on Diptheria

for M.D. Edin. 1885.

by

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Diphtheria

With special reference to an Epidemic occurring in the 5th dist. Sevenoaks Union October November and December 1883

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Definition:— Diphtheria may be defined as an acute specific disease, both Epidemic and Contagious; being characterised by a specific Inflam-ation of the mucous membrane, (chiefly of that covering the tonsils, uvula, and soft palate, the root of the tongue, the nasal cavities, and the posterior wall of the pharynx, frequently extending into the larynx, and down the windpipe); with a rapid exudation of fibrine, or non-organisable lymph, and its deposit within, and upon the surfaces affected. The disease is always attended with great prostration of the vital powers; also by an enlargement of the.

Definition

neighbouring lymphatics, frequently accompanied by changes in the Splen, & Kidneys, with the presence of Albumen in the Urine, as well as by a remarkable series, of local lesions & innovations, either coincident with, or gradually induced.
The tendency to death is by Asthenia, Apnoea, or by Syncope.

Historical Sketch.

Described since the Earliest ages of man.

described by Italian & Spanish writers in 17th. Century

History. Diphtheria, or as it was formerly called in England. "Putrid Sore throat;" or "Malignant Quinsy", or "Cynanche Maligna"; though undetermined, has probably existed since the earliest ages of man, and the writings of the older Physicians show that it has preserved its Essential character and nature from age to age. Hippocrates describes it in his Epid. lib v. tex 37, and during the earlier parts of the 17th. Century, accounts are given of its Ravages, by Italian & Spanish writers. An Epidemic that

occurred in Naples is recorded by Nola and Carnevale.

Dr. Fothergill in 1748 was able to identify an Epidemic that then existed in England, with a similar disease that had occurred on the Continent a century previous to it. Investigations of Dr. Fothergill 1748

Dr. Sam'l. Bard M. D. Edin. in 1776, greatly advanced our knowledge of this disease, by his careful observations during an Epidemic in North America, but it was not till the beginning of the present Century, when it made its appearance in Paris, occasioning the death of a member of the Royal Family 1803, that a large share of Medical attention was directed to its elucidation. Investigations of Dr. Sam'l. Bard. 1776

In 1818, a severe Epidemic occurred in Tours. Bretonneau, a French Physician, then made a careful and thorough examination, and investigation, which led to a more perfect definition of its character than was previously Investigations of Bretonneau during Epidemic in Tours. 1818

possible. It was Bretonneau who first suggested the term Diphthérite, (from διφθέρα vel διφθερίς a skin,) on account of the Characteristic local manifestation of this specific disease in the throat. This term however has since been modified into the now generally accepted one of Diphtheria.

derivation of word Diphtheria

In England during the present century, though isolated cases were from time to time observed, (Sir Wm. Jenner states in his lectures (Page 3) that he has seen cases of Diphtheria ever since he has practised medicine), it was not till 1849, that a severe outbreak of this disease occurred. At that time, more than 200 cases, of which 40 proved fatal, were recorded. Again, during the years 1858 to 1862, England was visited by a very formidable epidemic, which occasioned the loss of over 40.000 lives (Reynolds. Page 113); but since that time, the severity of outbreaks have never been so great.

Epidemic in South Wales. 1849.

Great epidemic in England. 1858-62

In October 1883, an epidemic of

Diphtheria occurred in the straggling villages of Chiddingstone (Pop. 1050) which is a part of the fifth district of the Sevenoaks Union. During three months, 55 cases were recorded: viz 5.24 of the population were affected, which occasioned 8 deaths. The Author, at this time, officiated as Med Officer of Public Health (pro. tem), as well as Parochial Medical attendant for the district.

Diphtheria in Chiddingstone October 1883

Etiology. The disease is caused by some morbid poison, and is propogated by contagion and Infection; it is also Inoculable, as shown by the experiments of Prof. Eberth and others, and it frequently occurs in the form of an Epidemic.

Etiology.

What is the actual poison? It is as yet unknown. Prof. Eberth has experimented on the lower animals and proved:-

What is the actual poison?

(1) That Diphtheritic Inflamation of the Cornea might be produced by inoculation with the diphtheritic membrane from the throat.

Prof Eberths experiments

(2) By inoculation with the exudation from the valves of the Heart, in cases of Endocarditis

(3) By inoculation with diphtheritic deposits from wounds.

(4) By inoculation with purulent exudation from inflamed veins in cases of Pyaemia

(5) By inoculation with purulent exudation from the peritoneum of puerperal peritonitis Patients

(6) By inoculation with the blood of women who have died in Child-birth from Septicaemia. Prof. G. Stewarts Lectures

But the Question still remains as to whether it arises independently. The probability is, that the poison is produced de novo, in decomposing masses of animal and vegetable tissue. Filth also in its various forms, especially Excrementitial, is an important Element in the propagation of this disease.

The poison probably produced de novo in decomp. masses of animal and vegetable tissue

The following history of the Epidemic that occurred in Chiddingstone 1863

will show the very contagious nature of diphtheria.

History of the Chiddingstone Epidemic :— History of Chiddingstone Epidemic

The Author was first called on Oct: 8th, to see a Child named Ellen Stollon, who was said to be suffering from a sore-throat; but which on examination, was found to be diphtheritic. On enquiry, it was learnt that her Sister Eliza, 5 days previously, had also suffered from a sore-throat with a general malaise, but not of a sufficiently serious character in the Mother's opinion, to keep her from the National school in the village; and it is most probable, that it was through this one child mingling with the others at the school, that the subsequent Epidemic ensued. For though an exhaustive Enquiry at the time was made, the history of no other cases could be discovered. Case of Eliza Stollon

The Stollon children lived in one of two semi-detatched cottages in a The inhabitation of the Stollon family

part of the parish known as Bough Beech. The back doors of the two houses opened into a common plot of ground, about 4 Rods in extent, which contained a well, the only available water supply; and two Earth closets, on the Moule principle.

On Examination of the closets they were both found, (but more especially the one used by the Stollons) to be in a terribly dirty condition, from want of proper attention, and it was learnt, that the filth was allowed to accumulate for sometimes a fortnight, and even longer before it was emptied, which was then done by digging a shallow hole in the ground, just sufficient to hold the deposits, and throwing a spade full of Earth over it. These deposits had been placed in every part of the garden, even as near as 3 feet to the well, and though the soil was very rich in quality, it would only grow the rankest of vegetables, and weeds.

Examination of the closets

On examination of the well, the brick sides, were found quite black, and covered with a greasy slime, from the continual drains of organic matter into it. The water was of a slight brownish tint, having a distinct smell and taste, and even by the naked eye, minute animal organisms could be seen swimming about. On allowing it to stand for a few days, it gave very perceptible evidence of its impurity. Chemical examination showed that both Chlorine and free Ammonia were present, as well as organic matter. One ounce of this well water when added to 20 ounces of 4% solution of the permanganet of Potash would at once change the colour of it.

examination of the well.

character of the water

By directions the well was thoroughly cleaned out - the first time in the recollection of either of the tenants, one of whom had lived there 35 years; and at the bottom a solid black mud ten inches in

The well cleaned out, the 1st time during 35 years.

deposit at bottom of the well.

thickness was found, consisting of organic matter with a most putrid and ammoniacal odour.

It was from this source, that Eliza Stollon probably contracted the disease, though there can be no doubt but that she had been exposed to the same infection through out her whole life. It is frequently noticed however that a chronic poisoning which sometimes occurs, as in this case, though greatly debilitating the subject; yet causes a certain amount of immunity; as is well seen among scavengers and the working classes generally.

The source of origin from which Eliza S. contracted the disease

A good deal of information was obtained from the Tenant of the house next door to the Stollons. She, an old woman of 70 years, living by herself escaped; but on examining her throat, the tonsils were found chronically enlarged and she was also suffering from goitre. She stated that nearly all the

Inhabitants, in the immediate neighbourhood, suffered always, more or less, from sore-throats; and, this was subsequently verified, when opportunities occurred, of examining different peoples throats. The tonsils, were invariably found, chronically enlarged, so causing an individual predisposition to such a disease as Diptheria. It was also learnt, that on account of the drought, during the past Summer, the particular well in question, had been very low, so consequently the poisonous materials existing in it, were more concentrated than usual.

prevalence of Sore-throat in immediate neighbourhood

drought during the previous Summer

Taking it for granted that this Epidemic arose by infection from the well. the disease was propogated by contagion from one to the other, in the following manner:- See sketch on page. 12 A

Ellen Hollon undoubtedly caught the Complaint from her Sister Eliza. with whom she slept;- the brothers John, and Richard, also, were infected from the same source; Mary Young was

Propogation of the disease by contagion

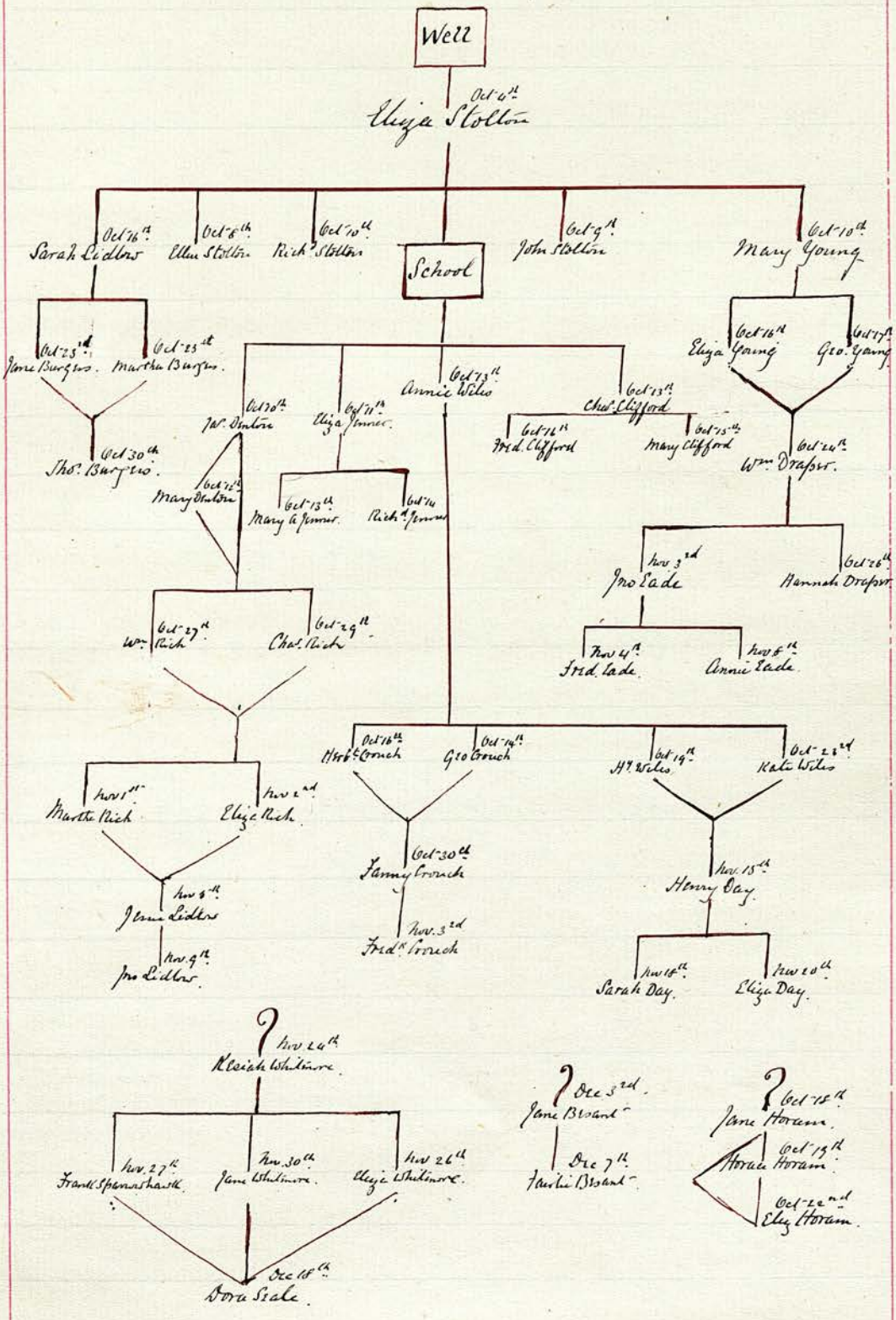
the play-mate of Eliza Stotton, and they had been together, as late as, the 8th Oct. At school Ellen S. sat next to Annie Weles they being in the same class. Annie W. contracted it, and took it home with her to the Aunts' (Mrs Crouch), with whom she was staying. A few days later, her little cousins (the Crouches), were laid up with the disease. Mrs Crouch then sent Annie W. (who had a very mild form of the disease) to her own home; and as a result of her doing so, the brother, and sister of A. W., became affected; and they in turn, communicated it, to their next door neighbours, the Days.

From Jas. Onton, who attended the same school, as Eliza Stotton, a long list of cases ensued, he giving it, to his infant sister Mary S., and from this source, the Riches (cousins to the Ontons), contracted it; who in like manner, gave it to Jessie Sedlow, living next door; and she (J.S.) subsequently gave it to her little brother John Sedlow, 4 days after she herself, ~~-~~ had shown

12 A.

Diagramatic Sketch

of the propogation of diphtheria during the Chadd's Epidemic



Evidence of the disease in her throat.

A very interesting and instructive case with regard to the stage of incubation was that of Sarah Lidlow (a nurse) Sarah L— had visited the Stollows on the afternoon of the 13th October Remaining but a half a hour; but on the 16th of the same month she herself had the Diphtheritic sore throat. The time from which she had caught the disease to that when the patch became visible, could not have been more than 58 hours, and not less than 54 hours. From this Sarah Lidlow, the Burgess with whom she was living contracted it; one of the cases proving fatal.

period of incubation in the case of Sarah Lidlow

Mary Young also was the means of spreading the disease to a very considerable extent; She giving it to her brother and sister. from whom the Drapers, living about 40 yards off, probably contracted it; they in like manner giving it to the Leaders (their relations).

Most of the cases as will be seen

by the Record were satisfactorily traced. Some however, as in the case of Keziah Whitmore could not be so. In her case the only conclusion that could be come to, was, that she had contracted it from coming into a tainted district by means of the infected air. K.W. had been out in service in Tunbridge Wells. where at the time no cases had been reported to have occurred. She however had left her place and had come home, (Aet 30 yrs.) on account of sickness, (She being very Anaemic); and though as far as could be learnt she had come in contact with no person suffering, or who had previously suffered from the disease, yet on the 24th November. She was suffering from a smart attack of Diphtheria. subsequently affecting her Sisters Jane and Eliza. as well as a Nurse child, Frank Sparrowhawk who died from Diphtheritic croup.

Susceptibility:— People suffering or recovering from some severe illness as Scarlet-fever, or those having weak throats

Predisposition of those in bad health

as from Chronic bronchitis &c; being consequently in a more or less debilitated condition are more pre-disposed to this disease during an Epidemic than the strong and robust: though both are liable to it:

Climate and Season do not appear to influence in any way the nature of the complaint. as is seen by the histories of other Epidemics occurring on the Continent and elsewhere. the same features are to be observed. nor does there seem to be a preponderance of the cases at any particular time of the year. Climate & Season. Season of the year

Nor Epidemic, no kind of soil or situations influences its occurrence. Soil.

Sex. Both are liable, but Females appear to be more so than Males. Sex.

In the Record appended (see page 76A) it will be seen that of the 55 Cases. thirty one (31) occurred in Females. the remaining twenty four (24) in Males. This proportion is increased when compared to the superiority in

number of the female population. Age.
Age. From the Statistics of the great — Dr. Farr's Tables
epidemic occurring 1857-62 when
24,219 deaths were registered from
Dyptheria. It was found that one
half of that number occurred in
children under five years of age;
the first year only being somewhat
below 10 per Cent of the whole number;
half of the remaining number or
25 per Cent of the whole took place
between the ages of five and ten;
and about 10 per Cent during the
next five years viz ten and fifteen.
During the next ten years viz between
the ages of fifteen and twenty five, the
proportion of deaths did not exceed
6 per Cent of the whole; from
twenty five to thirty five it hardly
reaches 2 per Cent; and it is
below 1 per Cent in a decreasing
Ratio for each succeeding decade.

(Dr. Farr's Tables. See Reynolds. page 113)

From this table it is evident that
age has a very pronounced influence

in the susceptibility to the disease.

The following age table of the Chiddingstone Epidemic proves of interest with regard to their corroborating to a great extent Dr Farr's age tables.

Age table in the Chiddingstone Epidemic

Age	No of cases	fatal cases
Under 12 months	4	3.
From 1 to 5 years	20	3.
From 5 to 10 years	16	0.
From 10 to 15 years	10	1.
From 15 to 25 years	2	0.
From 25 to 45 years	3	1
Above 45 years	0	0
	55	8

Is Diphtheria a local or constitutional in its origin?

Is diphtheria a local or constitutional disease?

Does the constitutional disease cause the local exudation? or does the local exudation originate the constitutional disease? It is difficult to say, and controversy has ran high on this question

Many on the one hand consider it as a purely local disease, urging in their arguments that Diphtheria fixes itself at the point of inoculation, as shown by experiments on

Animals. They compare it to diseases like Erysipelas being at first local and infecting the constitution subsequently. It is undoubtedly a fact that in many cases of Diphtheria, the first symptom that appears is the membranous exudation on the throat; and it may not be until the exudation begins to break down and putrify, so affecting the general system secondarily, by the absorption of septic poison, that any evidence of constitutional disturbance is noticed.

On the other hand, during an Epidemic, by careful enquiry and watching, you can generally discover the existence of premonitory symptoms, though slight, before the local manifestation makes its appearance. You might also get really severe premonitory constitutional symptoms followed by a mere trace of the special exudation on the throat.

It is most probable that Diphtheria is like other specific diseases. Scarlet fever

for instance, first of all, a constitutional disease, and like Scarlet-fever the first symptom or appearance which attracts attention and leads to a definite diagnosis is in the Throat. During an epidemic of Scarlatina which occurred in Ironbridge during the Winter of 1882. the Author saw several cases in which the throat displayed a diffused bright-red appearance. but this was unaccompanied either by subsequent Rash, or by any marked constitutional symptoms, the cases only being diagnosed, by others occurring at the same time. and sometimes in the same home. and accompanied by the Rash. But there would be few found who would declare Scarlatina to be a local disease. which might afterwards affect the constitution generally. The Author himself believes this specific disease to be primarily a constitutional one. having a local manifestation in the throat; for through the lining membrane of the

The disease probably is first constitutional.

throat may be, and probably is, the site where the poison inoculates the system. Yet as in Hydrophobia, the seat of inoculation does not constitute the disease.

Morbid Anatomy

Morbid Anatomy: — As in other infectious diseases, so in Diphtheria, certain organs are chiefly subjected to the disturbances of nutrition. The prominent and characteristic lesion in Diphtheria is the specific exudation upon certain parts of the mucous surfaces, also upon wounds and cutaneous abrasions. The seat and localization of this disease is on the fauces, less constantly in the upper portion of the air passages (Larynx & trachea), in the kidneys, spleen and in some very obscure manner in the nervous system. The membranous exudation rarely extends down the Œsophagus; but it has been found in the gall bladder, on the ovaria, and in the vagina. Prof. Sanders. Lectures 1876

Morbid Anatomy

Characteristic lesion in diphtheria

Seat of the Exudation

The manifestation in the throat occurs in the following manner:- At first there is redness and swelling

formation of the membrane

and the normal mucous secretion is so altered in its physical properties, that it adheres by its own increased viscidity to the mucous membrane. Little spots at first transparent afterwards opaque make their appearance on the glistening membrane. These spots quickly increase in size at their margins and coalesce, so giving to the surface a white and opaque appearance. This white or greyish white patch might extend over the whole of the inflamed surface in its immediate vicinity.

The diphtheritic exudation or the tissues involves the whole thickness of the mucous coat, so that it cannot be easily removed, & when this is accomplished, it always leaves an ulcerated loss of substance, which becomes quickly covered over again with the lymph. When nature throws off this deposit it does so by a superficial gangrene of the mucous membrane, which again depends on compression of the nutrient vessels by an interstitial fibrinous exud.n or from swelling of the tissue

The diphtheritic exudation involves the whole thickness of the mucous coat

Nature throws off the exudation by means of a superficial gangrene (Late Prof. Sanders)

Elements which are filled with a cloudy substance. (Prof. Sanders lectures 1878)
If the larynx and trachea participate in the disease, the croupous, not the diphtheritic form, of inflammation of the mucous membrane occurs. in which there is no intimate connection between the deposit & the membrane. so that it is easily separable from the subjacent surface, without causing any bleeding from tearing of blood vessels or leaving behind an ulcerated surface as in Diphtheria

croupous exudation does not involve the mucous membrane

Microscopical exam^n. of deposit on fauces.

Microscopical exam^n of the membranous exudation

after being well teased, and a section made through the membrane, from the most superficial to the deepest layers, the following is to be seen:- The most external part of the membrane will be found to consist of Epithelial cells, similar to those found on the normal tonsil. these are embedded in a homogeneous transparent substance through out which are scattered granular corpuscles & nuclear bodies. these become fewer in number towards the deeper layers of the patch, where in

are to be found. pus corpuscles. and fibrillae. the last getting fewer in number towards the surface.
During the later stages when the exudation is undergoing decomposition it presents other microscopical appearances there being especially large numbers of pus corpuscles to be seen. also the spores of the oidium albicans.

Chemical examination of deposit.

Chemical exam[n] of deposit

It is of an alkaline re-action, not affected by water. which on subsequent examination will show no trace of albumen. Caustic Potash will disintegrate and dissolve it; while Acetic acid causes it to swell up and become transparent. On heating a solution, (made by dissolving half a dram of the Nitrate of Potash in an ounce of water which dissolves it at a mean temperature) to 165° Fahr. it coagulates in flakes. a strong precipitate is also caused by adding Acetic acid to the solution. It is also stained brown by Iodine, and assumes the character of pure fibrin.

Denis' solution

Lymphatic glands:- The lymphatic glands at the angle of the jaw by the bifurications of the common Carotids, and supposed by Luschke to be in direct communication with the lymphatic vessels of the soft palate may be full much enlarged during the course of this disease. Such enlargement of these glands is in proportion to the severity of the local disease, and even the connective tissue in which these glands are placed may become the seat of infiltration with serum, and even the exudation of lymph, (Prof. Sanders lectures). So that very great swelling of the parts is the result. Suppuration however rarely occurs in these glands.

The lymphatic glands in the neck enlarged during attack of Diphtheria

P.M. appearances. The lymphatic glands of the neck will be found larger, redder, and firmer than usual, and if the disease has existed long they become brittle, pale & of a brighish red colour on section.

P.M. Exam.n of lymphatics (from late Prof. Sanders' lectures.)

late Prof. Sanders lectures 1878.

The kidneys:- The Albuminuria which occurs in 50 per Cent of the cases of Diphtheria is not to be considered

The kidneys

Albuminuria in 50% of the cases

as solely dependent on an original change in the blood, but chiefly upon a morbid process in the kidney which is one of the disseminated lesions of structure occasioned by the general disease, Reynolds. page 133.

The kidneys are rarely found healthy under microscopical examination after death. There is a special change in the intra-tubular structure, with conspicuous congestion of the Malpighian tufts, there is great opacity of the tubules, from engorgement of their interior, with finely granular epithelial cells, in which oil globules, are sometimes abundant, and occasionally blood corpuscles (Dr. Sanders's lectures 1876)

(ala) Prof. Sanders on condition of the Kidney. P. M.

The Spleen is usually found enlarged, and soft, pale in colour and often presenting a cloudy or opaque appearance on section in fatal cases of this disease.

The Spleen

The Vascular System. The blood undergoes considerable changes during the progress of this disease, as shown by the remarkable pallor during the illness, and the

The Vascular System

Changes in the blood

Anaemia of convalescence, also by the haemorrhagic tendency throughout the disease as well as by the occurrence of fibrinous coagula in the Heart and Great blood vessels. Sometimes met with after death.

The nervous system

The nervous system:— The pathological changes in the nerve centres, or in the peripheral nerves, on which diphtheritic paralysis depend have not been yet discovered; but it is possible that it arises from a failure in nutrition of the nerve tissues from the poor quality of the blood existing at the time.

lesions of innervation possibly due to bad nutrition of nerve tissues

This view of the case is the more likely, since no serious lesion, of the nerve centres takes place, as evidenced by the recovery from paralysis, that usually takes place, leaving no bad results behind it, the improvement of the paralysed parts generally corresponding with the recovery from the anaemic condition.

The Alimentary System

Post mortem examinations have sometimes found changes in the Liver, Stomach, Large and Small Intestines existing; but these are rarely the seats of special.

and serious manifestations of Diphtheria.

Symtoms and Course:—

Symptoms.

The disease after a short period of incubation generally attacks in an insidious manner, the first symptoms being as a rule of a harmless and insignificant nature. The Patient who falls with it may have been previously either in perfect health, or suffering, or convalescent from some other illness, as Scarlatina, Measles etc.

Insignificant nature of the first symptoms.

Diphtheria Rarely begins with a severe chill accompanied by nausea and vomiting;

Rarely begins with a severe chill

Among the earlier Symptoms may be mentioned the lassitude of the Patient generally a Child. He does not care to move about as usual, nor is eager to play; he becomes depressed, in his manner, and may cry, without any perceptible Cause; he does not care to leave the house, but prefers to sit still, near the fire; will look pale, and not care for or enjoy his meals, might even refuse them; he might complain, of a little headache, a feeling of chilliness, and.

Earlier symptoms of the disease.

sometimes of nausea, and pains in the back. At night the Child will be restless, and not able to get to sleep, may fall thirsty, and complain of pain in the throat especially during the act of Swallowing. On examination of the pulse it will probably be found Rapid run up to 130 or 140. with a temperature of 101 degrees or so, On looking into the mouth the tongue will generally be found covered with a thin creamy coat. If the fauces be not yet covered with the false membrane, but only somewhat reddened and Swollen; at this stage, the disease, appearing as a simple catarrhal angina, can only be Suspected or recognized. When the people about the patient have been Suffering from it, or from the fact that Epidemic is then occurring as an Epidemic in the neighbourhood.

The patient becomes feverish

exam^n of the pulse and temp^e.

Swollen and reddened appearance of the fauces.

These Symptoms gradually increase in Severity towards the 2^nd or third days when the Specific exudation in the throat becomes visible. When this occurs, the temperature which might previously

Symptoms become more severe. and the exudation in the throat becomes visible

have been as high as 104° or 105° falls somewhat; but the pulse continues rapid, as at 150 beats per minute, and becomes still weaker and more compressible. A very suspicious symptom, and one which usually occurs early in the disease, is the enlargement of the lymphatic glands at the angles of the jaw. It frequently happens that it is this enlargement which attracts the attention of the friends to the condition of the Patient — the previous complaints of the child having been passed by without much notice taken of them.

When Professional advice has been sought it is far more usual to find more or less extensive greyish white patches in the fauces at the first examination than to have the opportunity of examining the throat at the commencement of the disease, before the false membrane has begun to form.

The patch of exudation once formed tends to spread at its margins, until the whole of the throat might be

temp.^t might rise to 105°.

pulse becomes weaker and more compressible

Enlargement of the lymphatic glands in neck.

Medical attendant rarely sees case before the exudation has made its appearance

patch of exud.^n tends to spread at its margins

come covered with it. Sometimes creeping downwards into the air passages, or upwards and forwards into the nasal cavities. The glands at the angles of the jaw still increase in size, and may continue to do so till the whole of the front of the neck appears greatly swollen. The tongue now on examination will be found thickly covered with a creamy fur, deglutition becomes still more difficult, and the voice has a peculiarly muffled sound, from the obstruction offered to it by the swollen mucous membrane of the throat; especially if the case becomes complicated by the addition of Diphtheritic croup, paralysis of the soft palate, or its extension into the nares, when the two latter complications a nasal twang is given to the voice. The General symptoms now become very pronounced, the Patient being restless and nervous, the weakness increases, the pulse may be scarcely perceptible; but so

Cervical glands still increase in size and neck might appear greatly swollen.

condition of tongue

difficulty of deglutition

alteration of voice

The General Symptoms become very pronounced

always weak, and very Compressible; vomiting, and diarrhea, might occur; or perhaps a severe headache, or even delirium, with repeated attacks of Syncope. The breath also becomes very fœtid, from the putrefaction, of the superficial layers, of the local deposit. The mouth all this time is generally moist; and occasionally, there is a continual dripping from the angles of the mouth, of Saliva not mixed with mucous, and the decomposing secretion from the throat.

pulse very weak.

occurrence of vomiting diarrhœa severe headache delirium attacks of Syncope

Breath very offensive

The mouth generally moist

The above, is a general descriptive outline of a typical case; but any, or all of these symptoms, might occur in an attack of Diphtheria; and at any stage of the disease, resolution might take place, or the general condition of the Patient, might still go on, from bad to worse, till death takes place, from exhaustion of the vital powers, Syncope, or from the occurrence, of some fatal Complication.

resolution might take place at any stage of disease.

Cause of death

Complications of Diphtheria

Diphtheritic croup occurred in 20% of the Child. cases

Diphtheritic croup generally occurs during first week of illness

Either from spread of inoculation into windpipe, or from independent centres in the air tube

Symptoms of croup become superadded

Complications:- One of the most common of all of the complications of Diphtheria is the extension of the disease into the Larynx and Trachea. In the 575 Cases recorded in the Chiddingstone Epidemic, not fewer than 11 or 20 per Cent of the cases were accompanied by croupous inflammation of the Larynx.

When Diphtheritic croup does occur, it generally begins, not later, than during the first week of the illness. It may commence, in the Larynx, either by independent centres, or by the spread of the exudation, from the Pharynx to the Epiglottis, over the Arytaeno-Epiglottidean fold, and downwards into the Larynx, and Trachea; and even into the smallest bronchial tubes. The extension of the disease might proceed Rapidly, and the characteristic symptoms similar to those produced by the genuine croupous laryngitis will appear; or it may proceed insidiously, and at first only indicated by hoarseness or

weakness of the voice; gradually however signs of impeded respiration make their appearance as evidenced in the quick and short-breathing, livid lids, Edema of the face, at the same time the Constitutional Symptoms become still more intense, frequently changing their asthenic character to those of great excitement. The mortality from this complication is very great, most of the Patients dying, either with the Symptoms of collapse, or with those of insufficient respiration, and poisoning of the blood with Carbonic acid.

Mortality from Diphtheritic Croup becoming superadded is great

Of the 11 cases in which this complication occurred, 6 died. viz 54.5 per Cent - see Record of Cases. Page 76 A

Mortality of 54.5% in the 11 cases of diphth. croup

Renal system :- One of the most important complications, as evidence of this disease is the presence of Albumen in the Urine. During the Epidemic of Diphtheria in Chiddingstone village, the Author made an examination of the Urines of thirty one different Patients, selecting it from those (with the exception of infants), who

Renal Complications

Albuminuria

were suffering from the severer forms of the disease, the following were the results of his investigations, as regards albumen:- Seventeen samples of the urine, out of thirty one, were found to contain albumen, sometimes occurring in such large quantities that the urine appeared almost solid on boiling; the other fourteen cases were negative as regards albumen.

Results of testing for albumen in 31 cases.

Of the 17 cases in which albuminuria occurred, 14 happened in the first week of the illness.

The albuminuria resulted in no case of anasarca, nor was it found, to be persistent in any Patient; it generally having passed off in 28 days. Of the seventeen cases in which albuminuria existed. ~~[illegible]~~ The urines of twelve were subsequently tested, with the result that seven of that number were free of the albumen within 28 days; four within 2 months, the remaining case being lost sight of 3 months after she was first taken with the disease.

Albuminuria not persistent

but at that time albumen was still existing in large quantities in the urine.

In Patients suffering from Diphtheria, the urine, will be found to be, of an acid reaction, with a high specific gravity; urea, as a rule, being always found in excess; and uric acid, urates, oxalates, and sometimes granular renal casts, can be detected by the microscope. Condition of urine in diphtheritic patients

The Nervous system:- During the course, and very often, long after the termination, of the disease, a remarkable series of limited paralyses, referable to deranged innervation, frequently met with. Nerve complications.

This Diphtheritic paralysis might occur, or follow on, even in the mildest cases, and as a rule it makes its appearance three or four weeks after the apparent termination of the disease might occur in very mild cases.

Paralysis of the soft palate, and pharynx, is the most frequent form; and might occur early, as during the second, or even the first week, of paralysis of soft palate & pharynx.

the illness. When the soft palate is affected the patient has a peculiar nasal voice, also when swallowing liquids and even solids will enter the nose. When the pharynx is also paralysed, then the power of swallowing becomes very difficult. there might even be a complete inability to do so at all. this condition of things however rarely occurs till the later stages of the disease.

paralysis of soft palate (symptoms of)

symptoms of paralysis of pharynx

The most alarming symptoms of deranged innervation however are those referable to the Heart. The frequency of its beats per minute begins to diminish. and a sense of languor supervenes. there might be a continued sighing also a tendency to vomiting, death from syncope frequently occurring suddenly as in the case of Eliza Young aged 43 years, one of the cases recorded.

deranged innervation of the Heart

Eliza Young had previously been suffering from rheumatic fever, complicated with endocarditis and peri-

Case of Eliza Young

Carditis. Her attack of diphtheria commenced on October 16th with a severe Rigor. On examination of the throat - which was done with difficulty the whole of the soft-palate, including the uvula, & the tonsils, fauces and the back part - of the throat were found to be covered with the diphtheritic exudation. She was unable to swallow any solids on the 22nd - and even fluids would regurgitate through the nostrils, the nasal twang to her voice also gave evidence of the paralysis of the soft-palate and pharynx. This condition of things however improved by the 24th of the same month - she being able to take large quantities of beef tea and brandy; but - through out - she felt - frequently faint - and was constantly sighing - On the 26th however she died suddenly from the Heart - ceasing to act -

Many other forms of paralyses may

come on, generally as sequelae to the disease; and among them may be mentioned the paralysis of the nerves of the Special Senses, as of sight, hearing, taste etc. 35th Annie Wiles and Jane Stubbings some few weeks after the severity of the complaint had passed off, suffered from strabismus. In Annie Wiles it occurred in both eyes. She also had double vision; the pupils were immovable, nor was she able to distinguish objects aright; The symptoms in her case lasted 5 weeks, from the fifth week of her illness to the tenth.

paralysis of nerves of special senses.

Cases of Annie Wiles & Jane Stubbings

In the case of Jane Stubbings, only one eye became affected, and that owing to a serious retina. She was also able to distinguish objects perfectly; this condition in her case lasted but six days, having come on during the fourth week of her illness.

Paralysis of the limbs:- In seven cases out of the fifty five recorded, paralysis

paralysis of limbs

occurred subsequently in the limbs.
and of this number six happened in
the lower extremities.
In the case of Jane Horam, 14 years of age; Case of J. Horam
six weeks after her illness,
which had been severe, it was noticed
that her lower limbs jerked in a choreic
manner, causing her gait to be very
unsteady, and on more than one oc-
-casion it resulted in her falling on
to the ground. She complained also
that she could not feel the ground
properly with them, and that they seem-
-ed heavy and as though they
did not belong to her; also that
they sometimes tingled and burned.
On examination, there was found to be an
amount of anæsthesia to above the knee,
in the left leg, and midway between
the knee and ankle in the right leg.
In testing her with weights attached
to the feet, she was unable to dis-
tinguish which was the heavier of the
two, a seven and a four pounds. When
the seven pounds was resting on the left-

foot and the four pound weight on the Right. She was also not able to appreciate differences in temperature when test applications were applied to the affected parts. There was no loss however of tendon Reflex in either leg; but the loss of motor power was very evident; especially in the muscles of the calf in the left leg.
These nerve symptoms greatly improved and almost passed away during the three weeks from their appearance; but during the fourth week they returned again with renewed vigour. She was then unable to walk at all; and had to be lifted from her bed on to the couch & this condition of things lasted over a fortnight; then she commenced, and continued to make, a slow recovery; greatly assisted I believe by the use of the Continual current.
The other 6 cases recorded of paralysis in the limbs, as a sequalae of Dipthœria were not of so severe a type as the above, and calls for no Remark.

with the exception that the paralysis in the case of Charles Clifford. (one of the seven) was confined in the Pronator Radii Teres muscle in the Right arm. the Patient with great difficulty pronating the fore-arm, while the other muscles seemed to be in a perfect condition. case of C. Clifford

Reflex actions. might also be affected. as in the bladder or Rectum, the paralysis of the latter leading to constipation, which might be greatly aggravated by paralysis of the abdominal walls. Reflex actions

The Alimentary System: A special manifestation of this disease, in the Alimentary Canal is seldom or never seen in this Country. Prof. Hamilton however believes that Asiatic Dysentry corresponds to Diphtheria in the bowels. Alimentary System. Asiatic dysentry and diphtheria

Respiratory System:- Besides Diphtheritic Croup, which has already been described on page 32. Diphtheria might become complicated with various affections of the lungs, as a consequence of obstruction to respiration. Respir? System

Integumentary System:- A local deposit of membranous exudation may occur on any abraided portion of the skin as from the results of a blister. Also ulcers might become the seat of this special manifestation, as in the case of Mrs. Young (see record). In her case, on the second day of the appearance of the greyish white patch in the throat, a similar exudation occurred on a varicose ulcer of the left leg, which she was then suffering from.

Integumentary System

Case of Mrs. Young.

Sir Wm. Jenner in his lectures on Diphtheria has grouped the cases of it into six varieties as follows:-

(1) The mild form of Diphtheria, in which the general symptoms and the local lesions are trifling, and no sequelae follow.

(2) The inflammatory form, in which symptoms of severe cynanche pharyngea precede the exudation of lymph; the febrile disturbance may be extreme or moderate, but the pulse is very weak and there is a sense of

The various forms of Diphtheria (Jenner)

considerable protection. In this form it is not till 12 to 48 hours after the first symptoms of the throat affection supervene that a layer of tough lymph coats the inflamed surface, and death may occur from extension of the exudative process into the larynx. The urine also may contain albumen.

(3) The insidious form. So called from making its appearance suddenly and unexpectedly. The general symptoms are not severe; but suddenly laryngeal symptoms supervene, and death may rapidly follow from suffocation by stenosis of the larynx. This is the variety of the disease that may be confounded with primary croup, if the pharynx has not been examined.

(4) The nasal form, in which a sanious discharge from the nose attracts attention after some febrile disturbance of a low type.

(5) Primary laryngeal diphtheria, in which the disease begins with painful deglutition and is attended with redness and swelling

of the mucous membrane of the pharynx arches of the palate, uvula and soft-palate. Laryngeal symptoms rapidly supervene, and death threatens from apnoea.

(6) The asthenic form. in which the patient dies from the constitutional effects of the general disease, which may begin with general and local symptoms of very moderate severity.

Differential Diagnosis

differential diagnosis

The diseases most likely to be mistaken for Diphtheria, are the different forms of non-diphtheritic Sore-throat; Scarlet-fever and Croup.

Though easily distinguishable in severe cases, there is sometimes great difficulty, and it may be altogether impossible to diagnose some cases of non-diphtheritic Sore-throat from that produced in the milder forms of Diphtheria, where the Patient goes about as usual, with little or no constitutional symptoms, and only complaining of a slight soreness in the throat, especially when swallowing, and which on inspection will probably be found congested with

From Simple Sore-throat

a slight coagulation on one or other of the tonsils which may also be enlarged. In all cases however, especially during the presence of an epidemic, doubtful cases should be treated as though they were in reality diphtheritic.

Ordinary cases of diphtheria can always be diagnosed from those of simple catarrhal inflammation of the throat by the following differences: In diphtheria the redness in the fauces is generally more intense, but less uniformly diffused than in the catarrhal sore throat; the presence of a greyish white patch, the fact that the tonsils when affected are more tumid, and one side generally affected more than the other, and also the lymphatics at the angle of the jaw being always more or less affected in diphtheria, but often in simple sore throat; will serve to distinguish the former from the latter. The presence of an epidemic or the occurrence of other cases will greatly assist in forming a correct diagnosis

Tonsillitis:- Here the tonsils as in

from Tonsillitis

diphtheria are unequally affected, and the swelling in the glands at the angles of the jaw is seen in both; but the patch seen on the tonsil in tonsillitis, is of a yellow, soft and cheesy appearance, forming at the orifices of the inflamed tonsil; but this patch does not tend to spread and affect the mucous membrane of the neighbouring parts, also the constitutional disturbance is dependent on, and more in proportion to the severity of the local complaint.

Scarlet-fever:- Here the throat symptoms are always preceded by symptoms of severe febrile disturbance; which are persistent throughout; and are in proportion not to the throat symptoms; but to the severity of the attack of fever. In diphtheria on the other hand the premonitory symptoms are sometimes not seen noticed, though the attack may presently become of the severest nature. In Scarlet-fever the redness of the throat is uniformly diffused

from Scarlet fever

both tonsils also are Equally enlarged.
A milky white exudation might cover
the inflamed surfaces of the throat-
Generally, also the tongue and palate
might have a similar coating; but
this coating does not tend to increase
in substance and is not capable
of absorption, but is detatched in shreds
leaving a red and smooth surface.
In diphtheria the turgescence is not
uniformly diffused, but greatest in
those parts about to become the seats
of the exudation, the process of exud-
ation also continues to be active for
some time, and on its cessation there
is a separation of the exudation in
the form of membranous layers of
considerable thickness and extent; a
re-absorption of some of the product is
also possible.
In diphtheria the papillae of the
tongue are not enlarged and reddened
as in Scarlet-fever, also the tonsils
when affected are unequally so
In Scarlet-fever also there is no

tendency in the inflammation of the throat to spread into the air passages.

When the rash in scarlet-fever appears, then all doubts are put at rest. The presence of an epidemic, a case in the immediate neighbourhood, will also tend to guide one.

Erysipelas. This might occur in the throat either before or after its appearance on the face or head. You have the history of a rigor, and presence of headache, there may be some pain in swallowing also. some enlargement of the glands in the neck, but the redness in the throat is diffused, and none of the fibrinous exudation is formed out: which is the characteristic of diphtheria. from Erysipelas

Croup is one of the diseases to be most likely mistaken for diphtheria. especially Sir W. Jenner's insidious form, so in forming your diagnosis you have to be guided by the following:- from Croup

(1) By the mode of Origin — Croup arises from exposure to cold and wet, not so in diphtheria, in which however there might be a history of exposure to the effects of bad drainage or cesspools, bad water etc, or of contact with a patient suffering from Diphtheria, or of having visited a house, where such an attack had pre-existed, or the prevalence of an Epidemic

(2) The seat of the disease:— Croup is primary a disease of the larynx and trachea; while diphtheria is primary a disease of the throat: fauces and pharynx. spreading secondarily downwards into the windpipe.

(3) Character of the membrane exuded:— In Croup the membrane is smooth, regular and whitish in appearance, evenly moulded to the air passages, and easily detatched, as sometimes seen in the expulsive efforts of coughing or vomiting, it is also non-vascular and inodorous.

In diphtheria on the other hand, the

Membrane excited has a greyish irregular and uneven appearance, with a very putrid smell. especially towards the later stages. it is very vascular and strongly adherent to the adjacent tissues. on attempting to move some of this membrane from the throat bleeding will occur and an excited surface will be seen beneath it. the same results are also sometimes produced during violent fits of coughing.

(4) Constitutional condition of Patient:. In diphtheria the condition of the patient is depressed. the circulation is feeble, and there is considerable muscular weakness. In croup on the other hand the fever is much greater being sthenic and inflammatory.

(5) Course of the disease:- Croup as a Rule runs a much more rapid course than Diphtheria

(6) Complications and sequelae:- In croup you get no albuminuria nor paralysis, while in diphtheria albuminuria occurs.

in more than fifty per Cent (50%) of the cases; and paralysis is a frequent consequence of the disease.

(7) Contagiousness:- Croup is perfectly innocuous to the nurse & those attending on the patient; but diphtheria on the other hand is as contagious as small pox.

(8) Age of patient: Diphtheria generally occurs in children; but might attack persons of any age. Croup on the other hand is par excellence a disease of childhood.

(9) Croup assails the florid and robust while diphtheria singles out the pale and feeble, & those suffering from a just convalescent from exhausting diseases as Rheumatic fever. Scarlet fever etc.

Prognosis:-

Prognosis

Though the danger of death during the course of this disease bears a marked Ratio to the severity of the symptoms; yet however seemingly slight a case might appear the prognosis must always be guarded.

Marked Ratios of mortality to severity of Symptoms

always guarded

Jn though the patient may be suffering from no severe constitutional symptoms, and the diphtheritic exudation may be but slight; yet at any time it might become complicated, as by extension into the windpipe. It may be followed by paralysis, as in the case of Charles Rich 5 years of age. (One of the cases recorded). The attack in his case began on the 30th October 1883, and was of a mild form; there being scarcely any constitutional symptoms whatever. The temperature never rose above 99·2 degrees. The left tonsil was covered with a patch about the one third of an inch in diameter, and there was also an enlargement of the lymphatic glands at the angle of the jaw on the left side. The patient never kept to his bed, and was able throughout his illness to take his food exceedingly well. On the 3rd December however great weakness was shown when the child tried to walk, this weakness developing into

Case of Chas. Rich

complete paralysis of both legs. which lasted over a fortnight: but like the other cases it proved but transitory. as a complete recovery was made by the 18th of January 1884 This case of Charles Rich's shows the uncertainty with which the result of this class of illness must always be regarded.

The duration of this disease varies from a few days to two or three weeks, but the various complications that might occur may prolong the illness for weeks or even months. duration of the disease

The younger the patient the greater is the danger. The growth or spread of the exudation into the air passages must always render the case a very grave one. This extension of the disease into the windpipe takes place generally not later than the first week of the illness, so that after that time there is more hope of an escape from this complication. age of patients

When death takes place it is occurrence of diphtheritic croup

generally by the Seventh day, more especially when it is due to the complication of Croup. Hence the chances of recovery are more favourable after that date. Of the eight deaths recorded in the Chiddingstone Epidemic, five occurred by the Seventh day.

Death generally takes place by the 7th day

When the Heart's action is found to be feeble and slow from disturbed Innervation. the condition of the patient must always give rise to the greatest anxiety, for Death may supervene at any moment from the Sudden Cessation of the Heart's action. or from the formation of a clot within the Heart or in one of the great blood vessels.

Always serious when Heart's action is disturbed

If when the case is well advanced as on the tenth day, there is found to be extensive Exudation scattered over the affected surfaces, even though the larynx be not affected yet it must be regarded as unfavourable from the attending fever

When there is extensive Exudation on the 10th day it is unfavourable

Symptoms. co-existing with it.

Subsequently to the first week of the illness death is to be apprehended from exhaustion and loss of nervous energy. so that anything that tends to promote exhaustion, as vomiting or purging must be regarded as very unfavourable Symptoms.

After 1st week danger from Asthenia

Sir Wm Jenner also mentions in his lectures that a sudden rise of temperature during the course of the disease, and especially when delirium occurs generally proves fatal.

Sudden rise of temp.e especially when delirium occurs generally proves fatal (Jenner)

Treatment:—

Treatment

Whenever a case of Diphtheria comes under the notice of a Medical Man whether it be an isolated case, or during the prevalence of an epidemic; it is expedient that he should at once give notice of the same to the Medical Officer of Public Health; by so doing he will not only remove from off his own shoulders the responsibility of taking the necessary measures to prevent the spread of the disease

Notice to the Med.l Officer of Health.

but he will be in a great measure assisted in the outside management of his case. And one will find the benefit of this assistance more especially in the management of the poorer classes, to whom the process of isolation proves very irksome.

The Medical Officer of Health, assisted by the Sanitary Inspector will at once take precautions to isolate the patient, taking care that there is no communication between the affected house and others. (There is still great difference of opinion as to whether diphtheria can be communicated to a second person through the medium of a third carrying the poison about with him, though he himself may be free from the disease, which however is known is held. There can be no doubt whatever as to the wisdom of erring on the side of discretion). He will also take care that plenty of disinfectants are supplied, and will provide the means by which the Patient and Inmates

duties of the Med.l Officer of Health

of infected houses obtain the necessaries of life without the exposure of others to this disease by communication

It will be the duty of the Medical Officer of Health to endeavour to trace the origin of the disease. He will examine the drains, water supply et cetera; and endeavour to put the surroundings in a proper sanitary condition; and at the termination of the illness will see that the process of disinfection is properly carried out.

Personal general management:-

Place the patient in as large and airy room as it is possible; and it is better if the window faces the South, Southwest or West. If the Room also be on the top floor there will be a better chance of isolating the patient from the other members of the household. See that the room is well ventilated by window and fireplace. In it is of the utmost importance to both patient and attendant that a constant

General Manag[t].

position of the Sick Room.

Ventillation of Room

admission of fresh air into the
Room takes place; but there must be
no draught directed across the patient.
The temperature also should be kept equable, (at about 60° Fahr). temp.e of Room

With regard to the furniture in the Room, let it be as simple as possible and contain no unnecessary articles. For instance it should contain one iron bedstead (and sometimes a second one to change the patient on, especially when the illness is long and of a trying nature); on the bedstead should be a hair mattress, spring bed, or water bed, but there should be no curtains hanging to it; a washhand stand with jug and basin; a night-commode; a small table without any cloth to it; a couple of cane chairs, and there should be simply a strip of carpet placed round the bed, so that it can be rolled up every day, and the floor boards washed. furniture in sick Room

The greatest attention to cleanliness is indispensible. The linen of patients cleanliness

Should be frequently changed; the dirty clothes being at once put into fresh cold water with the addition of a little Carbolic in it (as 1 to 200) and afterwards well washed with Carbolic soap. The patient himself when practicable should be at least washed twice a day, and special attention should be paid as to the cleanliness about the perineum &c.

All excreta from the patient should be received into a disinfectant, and at once disposed of. The Sputa however is best wiped away from the mouth by an old piece of linen which should then be burnt.

Excreta should be at once removed

Any utensil such as spoons, forks, knives, glasses, cups and saucers or plates &c the the patient might use, should be well cleaned in a disinfectant immediately afterwards, and it is best that a complete set of utensils should be set aside for the patients exclusive use.

Utensils used by Patient

About the Room also should be distributed vessels containing Condys

disinfectants in the Room

fluid or a solution of Carbolic acid.

Those in attendance on a case of Diphtheria should never be overworked; they should take out-door exercise every day, and it is only necessary that one person should be in the sick-room at a time; they should also be very careful not to take the patients breath, and on leaving the room it is as well to gargle with a solution of permanganate of potash, or of Salicine. And to brush the hair well, also the clothes. Care to be taken by Dr. & nurse

It has been recommended, that those in charge of such infectious cases as Diphtheria should take a course of Benzoate or the Sulpho-Carbolate of Soda, as a prophylactic some Authors regarding these drugs as blood antiseptics. prophylactic treatment

Therapeutical Treatment:— From what has been already said with regard to the Constitutional and local nature of the disease; it is evident that the Medical Attendant must direct- General treat.

his attention to the alleviation of both conditions.

Up to the present-time no drug in our possession has been shown to act as an antidote to the diphtheritic poison; so that the recognised general therapeutical indications are;- not - to nullify the poison by means of specifics; but - to sustain the Patients strength and endeavour to withstand any encroachment of the disease.

No antidote to the poison

To aim at sustaining the Patients strength & to withstand encroachment

general treatment:- Great attention should be paid to the dieting of the Patient; let him take at frequent intervals of not more than one hour, without the patient is sleeping, bland liquid or semi-liquid food. this causing less pain and difficulty in swallowing than solids. Among the suitable foods may be mentioned, milk, beef-tea, mutton broth, veal broth, chicken broth, milk puddings, comflour, sago, arrowroot Eggs etc. If patient can take solid food lower

dieting of patient

which can generally be done in the milder forms of the disease. Especially when the food is reduced to a fine state of division as by mincing; it will greatly assist in supporting the patients strength.

Then due attention should be paid to the condition of the bowels, aperients are seldom required at the commencement of the illness; but when necessary see that they are not sufficiently powerful to cause any undue irritation of the bowels, for fear of a diphtheritic complication taking place in them as a result. A good aperient medicine for this purpose is the Pulv. Glycyrrhizæ Co (Germ) given daily in doses of half a drachm, when necessary, or the tinct. of Guaiacum (ʒi) in Glycerine will give excellent results. Salines should be avoided as a result, on account of their debilitating effects but when the fever becomes of a more inflammatory type as where Croup is super-added then frequently

Condition of the bowels

Salines should be avoided in ordinary cases.

a sharp purge. is not only necessary but proves of great service. When the bowels are very much blocked. and there is fear in giving purges sufficiently strong to open them. Enemata of soap and water or warm gruel and water is by far the most preferable means of obtaining a satisfactory result.

If on the other hand diarrhoea occurs, small doses of Chlorodyne, or of Subnitrate of Bismuth combined with a little Opium will prove of great service, and generally suffice. Constipation occurring in the later stages of the disease as a consequence of the paralysis of either the muscular coat of the bowel, or of the abdominal walls will require special treatment, as by medical rubbing stimulating enemata and galvanism, also internal remedies as Strychnine &c

occurrence of diarrhoea.

The Urine should always be examined from time to time, and if blood or albumen be found in it care should be taken that no Salines

Urine should be examined for albumen

or diuretics generally, which irritate the kidneys should be given. Acid and diluent drinks are of use whilst albuminuria persists; but as little alcohol as it is possible should be taken by the patient at the time

With regard to alcoholic stimulants they are generally required from the first; and nearly always towards the close of the illness, to help overcome the marked asthenia. A rapid but weak and feeble pulse, indicates their employment; Sometimes large quantities have to be given even to children, as when the throat symptoms are aggravated, and the feebleness of the circulation together with the general weakness are extreme. In the cases of Martha Burgess (6) and Herbert Crouch (3 yrs) very large quantities of brandy were given. and with success. Alcohol.

Martha Burgess, on the third day from the commencement of the scarlatina was in a very low and bad condition; the patients pulse at the wrist was Case of M. Burgess

So weak and small, that it was with difficulty felt; the heart at the same time was beating 160 per minute Frictions was given that the child should have a teaspoonful of brandy every twenty minutes, beaten up with some yolk of an egg, this quantity was increased on the fourth day to a teaspoonful every quarter of an hour and continued till the sixth day of the illness, when there was a marked improvement, and the dose of brandy was reduced to a teaspoonful every two hours. It is very probable that the brandy in this case kept the patient alive, and she eventually made a perfect recovery, after suffering from a slight attack of motor paralysis in the legs occurring as a sequelae to the disease.

When the patients pulse however is firm the Medical attendant should refrain, especially in the earlier stages of the illness, from giving alcohol, as it is not called for.

Neither is it wise to use, at any early date, without strong necessity, that which might be considered as the last anchor in our therapeutical treatment.

Therapeutics:— As soon as nourishment can be borne by the stomach, the tincture of the perchloride of iron should be given in large quantities combined with chlorate of Potash in glycerine a simple Syrup. Iron gives excellent results in this disease as evidenced by the diminution of the secretion from the fauces etc; but it requires to be given in large doses, as in half dram doses of the tincture of the perchloride of iron given every three hours. The iron possesses not only a general influence as a tonic, but a local one also by its stringent effect on the bloodvessels of the affected parts; and it also acts as an antiseptic towards the decomposing exudation

Therapeutics

Perchloride of Iron

Chlorate of Potash

Iron always proves useful

The powers of iron also appear

to give a better result than the protosalts, especially at the onset of the disease. A prescription which was found of great practical value during the epidemic at Chiddingstone is the following.

℞ Tinct. Ferri Perchlor. ℥vi
Potassae Chloratis ℥i
Glycerinae ℥vi
Aquae destill ad ℥viii
Misce.

Signatur.
℥ss every three hours

The Chlorate of Potash with the Glycerine greatly alleviates the painful act of swallowing; and is especially good when there is much tenacious secretion. Chlorate of Potash

Quinine is sometimes of use, in treating the severe headaches or vomiting which might occur, and in the later stages of the disease, as during convalescence proves of great value. Quinine

With regard to Opiates to relieve the restlessness and wakefulness at night; these at times prove of great Opiates

value; but they must always be given cautiously, especially when diphtheritic croup has become superadded to the disease

Local treatment

Local treatment:- Special attention should always be paid to the condition of the throat, and the painful symptoms must be alleviated by the application of soothing remedies to the affected parts, as well as by warm applications externally.

The desirable Result to be aimed at

The desirable result to be aimed at in our local treatment, should be the softening or suppuration of the membranous exudation, and the cauterizing of the parts antiseptic, so limiting the area of the deposit and the absorption of septic poison

Patient to cover up the throat

The patient should have a piece of flannel round the throat; and if the ears ache, as they must frequently do, a piece of cotton wool saturated with warm glycerine should be placed in them, and another piece of flannel should then be put

over the head and under the chin, so covering the ears well up. Instead of the simple flannel, warm applications such as linseed, carrot or bran poultices, or a wet compress might be applied externally; these latter applications proving very comforting, as well as promoting the disintegration of the exudation on the throat.

applic.ⁿ of warm fomentations poultices & the compress externally

The patient should be directed to steam or spray the throat either with milk or medicated lotions, he should suck honey, and more especially ice when the symptoms are very distressing. Gargling as with port wine, or any one of the undermentioned drugs, is of great value likewise.

patient should inhale & gargle

Sir William Jenner recommends the application of a strong solution of Nitrate of Silver (xx to ʒi of water) as a Remedy which may stay the inflammatory exudation. He recommends that it should be done but once; but done very efficiently. The Author tried this application but once

Application of AgNO$_3$ to the throat

during the Epidemic at Chiddingstone, the result however was by no means satisfactory as it appeared to greatly aggravate the disease. This heroic kind of treatment is probably more applicable to certain mild cases, with limited eruption; and accompanied by little or no constitutional disturbance.

Among other applications recommended are those of Hydrochloric acid, Chlorine water, Carbolic acid, Condy's fluid, Chlorinated Soda, Salicine, glyceride of Bran & of Tannic acid, the perchloride of Iron etc. All of these agents are more or less good, but the application which produces the most marked benefit, in its topical application, as well as in its general use is the Perchloride of Iron. It should be combined for this purpose with glycerine. (1 part of the tincture to two parts of glycerine)

Topical applications

The application of this latter mixture

not only alleviates the painful symptoms referred to the throat; but the iron has a topical influence on the decomposing exudation, acting as an antiseptic; while it also lessens the pouring out of the exudation, by its constringent effect on the blood vessels of the affected part. When this application of iron and glycerine is made, it should be done gently by means of a camel's hair brush; and not only to the membranous exudation itself; but also to the inflamed surfaces immediately surrounding it. Great care should be taken, so as not to forcibly remove any of the adherent membrane, so leaving a tender ulcerated surface. The liability to this accident occurring is the great objection to this mode of application; also there is great difficulty in operating on children in this respect.

Application of perchloride of iron and glycerine to the throat.

When the exudative process ceases, then the necessity for this local treatment has passed.

Treatment and modes of application when nostrils affected

When the nasal passages are implicated, the affected parts can be reached by means of a Syringe or better still, the nares can be most efficiently irrigated by placing the the vessel containing the medicated lotion (weak solution of Iron and Glycerine) at an elevation, and inserting an india-rubber tube from it into the nostrils.

Methods of applying local Remedies

The best means of applying these local Remedies, and the one least open to objections, is by means of a Spray producer, by which means the atomized dilute aqueous solution of the local remedy is thoroughly applied to the affected parts, without the disadvantage of irritating the inflamed surfaces. In place of a Spray producer an ordinary Bronchitis Kettle might be used, & the patient might be directed to hold his face over the open mouth of a jug containing the lotion raised to a temperature of 105° Fahr.

Another good method is by means

of gargling - but of course it is not applicable to infants and young children who form so large a proportion of the cases.

When the exudation is checked. or even disappearing, the general treatment at least must still be continued. See that the patient is taking plenty of nourishment; use precautions against fatigue or over excitement. Regulate the stimulants according to the requirements of the case, and look out for any sequelæ that might happen, which must be treated in the usual way. For the diphtheritic paralysis when it occurs, cold ablutions, cold douches, sea bathing & medical rubbing produce the best effects; the various forms of electricity especially the constant current might also be tried, but most reliance should be placed on the general treatment by means of tonics. For the sooner the patient is restored to good health, the sooner (and not till then)

Gen. treatment to be continued even when exudation disappearing.

Regulate the Stimulants

Look out for Sequelæ & treat them in the usual manner.

will the paralysis pass away.
When diphtheritic croup occurs. You
must treat it as for croup. in addition
to the general line of treatment laid
down for diphtheria, with regard
to Tracheotomy; this Operation is indic-
ated in every case where the larynx
is blocked up with the mem-
-branous exudation or threatens the
patients life with suffocation.
Up to the present time however the
results of this Operation have not
been encouraging, perhaps due in
many cases to the fact of the
Operation having been delayed
too long; or from the bronchial tubes
being in like manner affected.
In every case however where death
is impending from suffocation
through this complication of croup
occurring, it is the duty of the
medical man in attendance to
perform this Operation, as by so
doing it gives the one chance of
life remaining to the patient.

time is at least gained by it. And the patients' condition is meanwhile generally improved.

Finis

Record of the

occurring in
Oct. Nov & D

No.	Name	age	sex	date of Commencement	source origin	Albuminuria	D. Throat	Dpth. paralysis	Result
1	Eliza Stollon	6	female	Oct: 4:83	well	?	No	No	Recovery
2	Ellen Stollon	8	f.	Oct: 8	No 1 well	?	No	No	Recovery
3	John Stollon	9	male	Oct: 9	No 1	?	No	No	Recovery
4	Rich.d Stollon	2	m.	Oct: 10	No 1	?	Yes	—	Death
5	Mary Young	4	F	Oct: 10	No 1	Yes	No	No	Recovery
6	Jas. Denton	5	m	Oct: 10	school	No	No	No	Recovery
7	Eliza Jenner	6	F.	Oct: 11	school	Yes	Yes	of soft palate	Recovery
8	Mary Denton	8 mo	f.	Oct: 12	No 6	?	Yes	—	Death
9	Mary A. Jenner	5	F.	Oct: 13	No 7	Yes	No	of legs & Soft palate	Recovery
10	Annie Wiles	7	F.	Oct: 13	school	Yes	No	Strabismus	Recovery
11	Chas. Clifford	6	M.	Oct: 13	school	Yes	No	of arm	Recovery
12	Rich.d Jenner	14	m.	Oct: 14	No 7	Yes	No	No	Recovery
13	Geo. Crouch	8	m	Oct: 14	No 10	No	No	No	Recovery
14	Mary Clifford	9	F	Oct: 15	No 11	Yes	No	No	Recovery
15	Sarah Sidlow	33	F.	Oct: 16	No 1-4	?	No	No	Recovery
16	Herbt. Crouch	3	M.	Oct: 16	No 10	Yes	Yes	of Soft palate	Recovery
17	Eliza Young	43	F	Oct: 16	No 5	Yes	No	of throat & H	Death
18	Fred.k Clifford	2	m	Oct: 16	No 11	?	Yes	—	Death
19	Geo Young	7	m	Oct: 17	No 5	?	No	No	Recovery
20	A.r Wiles	5	m	Oct: 19	No 10	No	No	No	Recovery

cases of Diphtheria
the village of Chiddingstone
1883.

Notes
A very mild form of the disease. Received no treatment.
a mild attack, with but little constitutional disturbance
Extensive exudation over Soft palate, fauces etc
Death on the 5th day suddenly from suffocation
Mild attack, convalescent on the 8th day.
Mild attack, but lymphatics in neck greatly enlarged.
Very severe attack. ℥ii of brandy given every 1½ hours. 3rd-6th day.
Death on the 5th day from exhaustion.
paralysis of Soft palate occurred in this case. also anaesthesia in fort
after mild attack strabismus (double) occurred lasting from 5th-10th week
Paralysis occurred during 3rd week of illness, loss of power to pronate arm
Mild case - albuminuria lasted. 4 weeks.
Very mild case - patient not keeping to his bed
Extensive exudation in the throat & on Soft palate
Mild case - but left her very exhausted.
Very sharp attack, large quantity of alcohol given
Death on 11th day from paralysis of Heart.
Death on the 7th day - during a paroxysm of laughing
Mild attack - convalescent on the 10th day.
Mild attack, but left very anaemic

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No.	Name	age	sex	date of attack	Source origin	Albumenuria	D. Croup	Depth. paralyses	Result
21.	Jane Horam	14.	female	Oct: 18	?	Yes	No	Of legs & soft palate	Recovery
22	Horace Horam	11	male	Oct: 19	21?	?	No	None.	Recovery.
23	Edgar English	6	M	Oct: 19	?	?	No	No	Recovery
24	Susan Rush	7	F	Oct: 19.	?	?	No.	Nasal twang produced.	Recovery.
25	Ellen Stubbings	14	F.	Oct: 19.	?	No.	No	No.	Recovery.
26	Eliza Horam	4	F	Oct: 22	Nos 21 & 22	Yes.	Yes.	No	Recovery.
27	Kate Wiles	2.	F.	Oct: 23.	No. 10	?	No.	Nasal twang	Recovery.
28	Jane Burgess.	11	F.	Oct: 23	No. 15.	?	No.	—	Death.
29	Wm. Draper.	13	M	Oct 24	Nos. 17 & 19.	No.	No.	No	Recovery.
30	Martha Burgess	6	F	Oct: 25.	No 15	Yes	No.	Of legs & soft palate	Recovery.
31.	Richd. Stubbings	3.	M	Oct: 25	No 25	No.	No	No	Recovery.
32	Hannah Draper,	4 mo.	F	Oct: 26	No 29	?	Yes.	—	Death.
33	Wm. Rich.	13 mo.	M	Oct 27.	Nos. 6 & 8	?	Yes.	—	Death.
34	Chas. Rich	5	M	Oct 29.	Nos 6 & 8	?	No.	Of legs & soft palate	Recovery
35	Thos. Burgess.	8.	M	Oct 30.	Nos 28 & 30	No	No	No	Recovery
36	Fanny Crouch.	15.	F.	Oct 30.	Nos 13 & 16	Yes.	No	Of legs	Recovery.
37	Martha Rich.	2.	F	Nov. 1st.	Nos 33 & 34	?	Yes	No.	Recovery.
38	Eliza Rich.	36.	F.	Nov. 2nd.	Nos 33 & 34	?	No	No	Recovery.
39	Fredk. Crouch.	22	M	Nov: 2	No. 36	?	No	No	Recovery
40	Jno Eade.	4	M	Nov: 3	No. 29.	No	No	No	Recovery.
41	Fredk. Eade.	16 mo.	M	Nov: 4	No 40	?	No	No	Recovery.
42	Jessie Lidlow	17	F.	Nov: 5	Nos 37 & 38	No	No	No	Recovery
43	Jane Stubbings.	9.	F.		?	Yes.	No.	Strabismus.	Recovery.

Notes

paralysis of both legs occurred 6 weeks after illness, & lasted 10 weeks.
A very mild attack; did not keep to his bed.
do do
Extensive exudation, voice became nasal on the 4th day.
very mild attack, no bad Symptoms.
A severe attack complicated with croup on the 5th day.
A severe attack great asthenia - brandy given ℥i every 2 hours.
Death on the 4th day from Exhaustion.
very mild attack. no bad Symptoms.
large quantity of brandy given in this case. Slight attack of paral. in legs.
A mild attack. Constit. disturbance almost absent.
Death on the 5th day from Exhaustion.
Death on the 8th day from Exhaustion.
Though very mild case, patient spoke with nasal twang & paralysis of both legs & set in 5 weeks after illness ℈.
A mild case. patient not keeping to his bed.
A smart attack lasting 10 days followed by motor weakness in legs.
Severe attack complicated with croup on 4th day.
A mild attack. patient in bed 2 days.
very mild attack. no constit. disturbance observed.
do do
Mild attack lasting four days.
very mild attack with little Constit. disturbance
Single Strabismus occurred during the 4th week; Albuminuria in urine & three months after illness ℈

No.	Name	age	sex	date of attack	source of origin	Albumen	D. Croup	Dipth. paralysis	Result
44	Jno Liddon	4	M	Nov. 9th	No 42	No	No	No	Recovery
45	Henry Day	16 mo	M	Nov: 15	Nos 20 & 27	?	No	No	Recovery
46	Sarah Day	4	F	Nov: 18	No 45	No	No	No	Recovery
47	Eliza Day	3	F	Nov: 20	No 45	No	No	of limbs	Recovery
48	Keziah Whitmore	15	F	Nov: 24	?	Yes	No	No	Recovery
49	Eliza Whitmore	3	F	Nov: 26	48	?	No	No	Recovery
50	Frank Sparrowhawk	6 mo	M	Nov: 27	No 48	?	Yes	—	Death
51	Jane Whitmore	7	F	Nov: 30	No 48	No	No	No	Recovery
52	Jane Brand	8	F	Dec 3rd	?	No	No	No	Recovery
53	Fanchi Brand	6	M	Dec 7th	No 52	Yes	No	No	Recovery
54	Dora Seale	19	F	Dec 16th	Nos 50, 51, 49	Yes	No	No	Recovery
55	Annie Eade	14	F	Nov 8th	No 40	Yes	No	of Soft palate	Recovery

* Where the source of origin is unknown it is indicated by the note of interrogation ?; the same applies to the presence of albuminuria.

Notes.

A very mild case - patient not keeping to bed
A mild case - there was no enlarg^t of lymphatic glands
A very mild case, was able to take her food as usual
A mild case, but 3 weeks afterwards there was some weakness in legs
A mild case - was able to take plenty of solid food
A very mild case - scarcely any constitutional symptoms
Death occurred on the sixth day from asphyxia
A very mild case - only diagnosed by patch on throat
Patient kept to her bed two days when symptoms subsided
Patient did not have to take to his bed. very mild
Mild attack - Albuminuria lasted 7 weeks
A severe attack accompanied accompanied with exudation in nares