Diphtheria

Diphtheria or Diphtheritis is derived from a Greek word Διφθερα “a pallid.” It was first applied in 1821 by Dr. Reton claim of a disease epidemic in India. It was characterized by an exudation forming a false membrane or petechia on the mucous membrane of the fauces, throat, and pharynx continuous with it, & by the surface of the body being attacked in the same manner wherever it was. Lesions, eruptions, or ulcers had caused the skin to assume the appearance of a mucous membrane.

Dr. Reton published his treatise on Diphtheria in 1822. Containing his observations on these epidemics which had come under his notice at home, in Mobile, Charleston. He showed that the disease was not a modern one, but had occurred from time to time in this country & on the continent during the last 300 years & that it might even be traced in writings of a still earlier date. The older authors described it under a variety of names as Angina ulcerosa, Lycanthria, ulcerosa, epidemicus, Morbus hysteragogus, Morbus hypothentae, &c &c &c few of them
were aware of its true involved anatomy.
A Retonean in his lecture showed that all
the symptoms described under these different
named were referable to one disease according
as the explosion extended more or less, that the
appearance of puapna was not due to a lack
of substance in the mucous membrane, but
to the protrusion of an inorganizable false
membrane.
The first clear description of aphtitana is found
in the writings of Pyreneus who speaks of it
as being much harder & common in Egypt &
Syria & as having therefore received the name of
the Egyptian or Syriac ulcers. He carefully
describes the disease under all its aspects &
particularly points out the fact that children are
most liable to it. "Mone m. toniillar firmat
alpno mutia, alpno petrice, cervicar, fletura
uten, dent lata Oara puapna, guardam, concereto
ramon albo, lido, aut supra dor dentia. Quod
de concereto illa lordo alto desenderunt, affectan
ille ebrae xet, atque ista facio vocatur, latina
Crusta: Crustan vero circumvenient albo epelleum
et inflamatio et egpna, paracrae functae"
creatus, quique superanantes in unum coalescent atque rite latum ut eas effecerit. Et si iterum
in ore dispacento sorpist ad colunnellam reque
percussit, quem quem oculi patent et pugnaverat,
anteque inde labe spectator et desingens
in collum etiam. "Hecrae omnes crumpe". Atque est
hunc ut multis diesbus interissent. Et si in
pectus pri ateriam at malum suradit illo
eadem die. "Quesi uget ad
"Pubertatem magis nec modo tanta", "

The symptoms arising when the false membrane
extends to the air passages are very graphically
described in the following passage.
"Audie Sphingique difficulter eauscetur, et ludas
vel morte quam misterrimis accidit. Pallida
his seu lirida facies, h antiquum cum treuilla
Consipruntur. Cumque decumbent, aegrit
et sedent, decubitus non ferentus quam
sedent, quem caritas estern decumbere coequentur.
plurumque post mortem dambulant non quiescere
mequement. Incipit magis et, depositio ver
flava; panicem adit vocique depressit. Hec
digna in Regem dum cum subito in terram
collapsis animo dextaur."
Towards the end of the 15th century it is probable that an epidemic laid in Paris as a large number of adults as well as children were carried off with smallpox symptoms. This epidemic was considered by old Bello to be smallpox, but Retzianes agrees with Roger Eddard in thinking that Bello had mistaken the disease.

During the 17th and 18th centuries epidemics broke out not only on the Continent but also in England and America.

It appeared in Spain in the beginning of the 17th century and was accurately described by Mercatus Fontenio and Steredius under the name of the Morbus strupulaturnis or farstilus as it was popularly called. Mercatus particularly points out the rapidity of fatality of the disease & the disproportion frequently observed between the real and apparent danger. Steredius, who wrote 20 years after Mercatus describes the different varieties of diphtheria & includes among them the diphtheria forms of the throat common during epidemics of the disease. His description would therefore record almost exactly what has been seen during the last few years in England.
In 1618, a disease appeared in the territory of Naples and carried off many children. It was popularly known as the "Male in Camo". It was described by several physicians among whom were Spanabati, Carneroli, and others.

In 1632, it had appeared in Sicily and was described by St. Filipo as the "Male in Camo". About the same time, another Italian physician, Cottammis, wrote on this disease and attempted to show that the South Italian or the disease epidemic in Sicily were different, but there is no doubt from his own description that they were one and the same.

From this period up to the 1740s, the disease appears to have disappeared as no account of its prevailing epidemically can be found. At the same time, St. Botanica's opinion is probable enough that the disease had not disappeared entirely but was confused with other diseases. In 1747, a disease occurred which differed from the diseases described by at least its symptoms. This new disease, sometimes attributed with difficulty of deflection and sometimes not, a circumstance
which has been frequently observed in epidemics of malignant ague as he named it. They pointed out that the suffocation was caused by a pseudo-membranous exudation in the larynx.

The first notice of its occurrence in this Country is by Dr. Fothergill who described a putrid sore throat which was epidemic about 1740 in London and its vicinity. It is apparent however from his account that smallpox was prevalent at the same time and was in many instances mistaken for the true aphthous sore throat.

Fothergill described a communicatory disease which was epidemic in London in 1748 and 1749 and which was evidently smallpox. Other diseases as Sallow fever, small pox, measles even frequently accompanied by the throat of a scrofulous character as if the epidemic had imparted its character to them.

Dr. Humphrey of Plymouth observed an epidemic there which lasted from 1752 to 1753. He gives a very excellent account of the general symptoms & the appearance presented by the
Great which he, like most other writers, considered to be that of sloughing ulcer.

The breath was much more difficult, with a kind of rattling quality as if the patient was actually straining the voice because of breathing through a hollow cavity resembling that from several sores in the face. The voice in speaking or breathing was so peculiar that any person in the least conversant with the disease might easily know it by its odd noise, from whence indeed the Spanish physicians gave it the name of fariguela referring the noise which such make as an straining with a pipe.

The epidemic of diphtheria raged in Paris in 1748 and in this as in other instances principally attested children. Chmel in his History of Pneumonia in his work mentions that the first was slight at the commencement and that the patient got rapidly exacerbated from day to day. Death actually took place on the 5th, more commonly in the 7th to the 9th day. When the patient presented complete convalescence was long delayed from the debilitated state the system
was left in by the attack.

In 1768, a physician at Aix-la-Chapelle published a treatise on pharyngitis. The first attack in which he had been epidemic than eternal years previously.

From this time till 1818 no other epidemics seem to have occurred in France.

Diphtheria was epidemic in Sweden for about ten years from 1755 to 1765. The bug was of diphtherial varieties of the affection, we're considered to be distinct diseases and were respectively known as pharyngitis and diphtheria.

In 1771 diphtheria appeared in the City of New York and proved very fatal, more especially among children under 10 years of age. While it prevailed adults but generally females were also attacked with it in its milder forms.

Dr. Rand in his account of the epidemic states notice of the weakness of the lower extremities of loss of voice continuing for a considerable time after recovery from a severe attack of the same. It has been observed in the latter epidemic in this country and on the Continent.

From 1818 to 1821 diphtheria spread in London.
At first broke out among the soldiers of the Army of La Vendée and then spread among the inhabitants of the town.

Among the soldiers it principally attacked the gums and was at first mistaken for a tubercular affection. This variety occurred in the proportion of nine to one of the pharyngeal and all attacked by it recovered under his treatment with the exception of one case where the disease extended to the larynx.

Among the townpeople the principal variety was the most general and was by far the most common cause of death as out of fifty post mortem examinations which he made death had been caused by the obstruction to respiration in all but one case where the fatal result had been due to exhaustion.

In 1824, Diphtheria appeared in La Ferrière, a small village a short distance from Laus to in 1825 in a small hamlet named Cheminon about a league south of La Ferrière.
In 1821 & 1822 Dr. Mackenzie of Glasgow—
published in the Edinburgh Medical Journal
& in the Medical and Surgical Review—his observations
on some cases of diphtheria, which had occurred
in Europe & which were undoubtedly cases of
diphtheria. He was astonished to find on a post
mortem examination of two of these cases that
the tonsils would have been entirely coated only
with an effusion, as he had expected a more
severe loss of substance in these parts from the
appearance they presented during life.

These papers seem however to have attracted little
notice & diphtheria was almost unknown in
this country until the end of the summer of 1832
when it broke out in an epidemic form in
England & has continued more or less up to
the present time.

After the epidemic in Paris diphtheria extended itself
gradually throughout France. Committing great
narcises among children.

In 1833 Paris & Bologna were attacked in the
latter place it is said that the disease was
more general & more fatal among the
English residents. These epidemics differed
from that at Rome in the galleys of the Black Death. Commonly it is the fatal result being usually due to the exhaustion caused by the disease. Diphtheria appeared in the north of England towards the end of the summer of 1836 and gradually spread northwards during the four subsequent years. It resembled pretty the Paris & Boulogne epidemics & has always been characterized by its remarkable ashen hue. In moving northwards it fell with greatest severity on the eastern counties of England but it does not appear to have broken out as yet in Scotland in an epidemic form. Operative cases have occurred however, here & there. Dr. Spencer, surgeon to the Edinburgh Royal Infirmary, mentions in the last volume of the Edinburgh Medical Journal his having met with two or three cases of diphtheria during last year & two cases have occurred this winter in the Medical Wards of the Infirmary one of which proved fatal.
Symptoms

The symptoms of diphtheria at its onset vary much in their severity in different cases. In a large number of cases the patient (usually a child) seems about apparently in good health and complaining of nothing but slight sore throat, while in others the disease is ushered in by symptoms of the general febrile phenomena. Pain in the throat is very marked, and there is great general depression. The pain in the throat is usually one of the first symptoms and is of a piercing or burning character. It may be followed by pain of difficulty of deglutition lasting but not invariably. The pulse is usually somewhat accelerated at first and the skin slightly hotter than natural but never having that feebleness and coldness in Sclaffia. In the course of the disease the pulse becomes very feeble and the patient's strength becomes diminished out of all proportion to the lesion in the throat.

On inspecting the throat, the tonsils exfoliate, and are seen to be swollen and of a dark red colour. White patches surrounded by red membrane appear on the tonsils, and other remain separate or
Coalise together to form a continuous false membrane which may spread over the faucae and back of the throat and thence extend to the nasal fossae, larynx and sometimes to the trachea. When the false membrane extends to the air passages, crypto sympaties are developed the patient but partly recover.

From the commencement of the attack, there is always considerable swelling at the angles of the jaws, which is caused by enlargement of the lymphatic glands or frequently also by infiltrated lymphation around them. Some have supposed that the parotid and submaxillary glands were the seats of the swelling but this is erroneous as 

M. Kptomeiow satisfied himself by post mortem examination that they were seldom if ever affected.

Cases of diphtheria may be conveniently divided into three classes according to the severity of the attack.

In the first the throat appears vascular and is covered by a thin translucent film as if the surface had been varnished or covered with a thin layer of glue. This film may coat
the tonsils of pharynx may extend over the mucous membrane of the gums & cheeks but constitutional symptoms are mild. Such cases rarely terminate seriously or are followed by troublesome sequelae. They are apt however to become chronic & to leave some induration of the throat for several weeks. In the worst class of cases the prognosis is also favourable though the attack may be attended with great disquietude. It is characterized by the throat, soft palate, & tonsils being swollen & presenting a erythematous induced & lary the appearance on the tonsils of white opaque patches of more or less membranous consistence but which show no tendency to coalesce or extend. More rarely these white patches are also seen on the pharynx. They generally disappear insensibility or become detached & hang down in shreds but there is more of that tendency to ulceration of blood as observed in diphtheria.

In some cases the white patches coalesce & extend over the whole of the throat & pharynx
of the car may spread to the brain or to the
lungs or the oesophagus.

The false membrane becomes of a considerable
thickness and consistence. It assumes a greenish,
brownish or blackish color which is due to
the suppuration & decomposition, & the breath
is consequently rendered very fetid.

The patient lies in a state of extreme debility
& it is frequently with the greatest difficulty
that he can be induced to take any sorts of
medicine. This in many cases does not
arise from the power of swallowing being lost
but in consequence of the patient unwillingness
to be disturbed.

The following is Dr.

Rippon's description of the appearances
presented in cases of pharyngeal asphixia.

At the beginning of the disease there is seen
on one or both tonsils a circumferential nutrient
which is covered by mucous not perfectly
coated. This first layer consists of porous\nepithelium which may be raised by portions of
mucous membrane, so as to form vesicles. Often in a few hours
the red spots extend evidently nearer nearer
by continuity or by contact on the lance.
manner as a liquid which is spread on a flat surface or which flows in little streaks in a canal. The coagulum becomes opaque white or thick. It becomes of a membranous consistence. At this stage it is easily detached from the mucous membrane & adheres to it only by slender prolongations of connective matter which penetrate into the mucous follicles. The surface which it covers is usually of a slightly red tint with points of a deeper red. This tint is more marked around the edges. If the surface of the mucous membrane can be seen by the false membrane becoming detached, the glands which appear beneath under the coagulum return, the red spots allow blood to transude, the membrane is renewed & becomes more & more adherent upon the spots which were first attached. It acquires frequently the thickness of many lines & falls from the white colour to brown—gray & black. At the same time the transudation of blood becomes still more easy & this is the source of the Stettradia so commonly mentioned by authors. The alteration of the
Organic tissue is more apparent in this stage than at the beginning. Frequently portions of concrete matter are forced out in the substance of the surrounding tissue. A slight erosion of the cartilage in the cartilage or cartilage in the cartilage is observed on those parts which lay these blemishes are exposed to any friction or on which the extraction of the false column has been attempted. It is especially at this period that the Concretions which have become partly exhaled and formed odour. If they are seen and the redness of the surrounding Cellular tissue makes them appear depressed from this appearance they are very liable to the metastasis for sloughing here with considerable loss of substance. If on the contrary they are extended over a considerable surface they become partly detached, hang down in shreds more or less abundant to delimitate the last stage of gangrene.

From the pharynx the suppurative membrane may pass into the nostrils. It at first gives rise to symptoms similar to those met with in Sore or Cold in the head, stuffying of the
The false membrane either only encroaches the margins of the posterior border or almost entirely covers the lining of the nostrils. It may sometimes be seen at the anterior border, sometimes only a slight reddish of the margins of the upper lip is apparent, but wherever the ethmoidal membrane is affected considerably there is a profuse discharge of an acid viscous fluid not infrequently haemorrhagic to a great amount. This form of the disease is very apt to be overlooked, but its is much to be dreaded from its insidiousness and its tendency to become chronic.

In two cases mentioned by Bretanveau the false membrane was found after death to have extended through the ceratophyseus to the cardiac end of the esophagus. From cases collected by Dr. Greenhow it appears that this variety is marked by extreme difficulty in deglutition amounting sometimes to total inability to swallow even fluids, followed in some cases by vomiting as if the disease had extended to the stomach.

The most fatal form of diphtheria is that
in which the false membrane extends to the larynx & gives rise to the same symptoms as seen in ordinary Croup. The patient begins to suffer from short Paroxysms of Coughing occurring at longer or shorter intervals & attended with a feeling of suffocation. The Cough is dry, hoarse, stifled & is followed by a labored inspiration & sometimes by vomiting of mucous matter & of membranous shreds, occurring spontaneously or brought on by the use of narcotics. During the intervals of the Paroxysms, respiration is accelerated & attended with a peculiar labored noise. The pulse is more frequent than natural & the voice is hoarse & has a metallic tone like the cough. The face becomes puffish & assumes a livid, pale, & the lips have a violet tincture. The patient is inclined to demoniacal & when the Paroxysms come on, starts up with a feeling of suffocation out of all proportion to their duration. Recovery may take place during this stage & is indicated in by the coughing becoming more & the noisy respiration lessening, & the fits of
suffocation gradually disappearing. The face gradually assumes its natural appearance, but the voice usually remains hoarse and the pulse remains accelerated for a considerable time after convalescence is established. When the disease advances the symptoms become augmented in their severity. The voice is at least partially suppressed and the pulse is frequent and irregular. The respiration is rapid and labored, and attended with the peculiar breathing noise which may be heard at a distance from the patient. The patient lies in a delirium from which he is again and again aroused by the fits of suffocation. He starts up and often at the same time puts his fingers into his mouth or to the front of his neck as if to clear away something strangling him, whereas the older writers named the disease the "Morbus Strangulatorius." Death usually takes place in one of these paroxysms but if the patient has been in a weak state previously or if a lowering fluid of intestines has been carried out, then violent fits are awaiting, and he dies in a transient afflication.
The extent to which the false membrane extends in the air passages varies much. In some cases it only lines the larynx; while in others it has been found to reach the extremities of the bronchial tubes.

Diphtheria occasionally extends from the throat into the mouth, but this has been rare in English epidemics. In the epidemic observed by Retzius, the disease began in many cases on the gums & extended to the cheeks; in some cases even to the face. It was sometimes at first by them & others for scrofulous gangrene. This form usually preceded the appearance of a greyish ulceration along the margin of the gums from which blood freely issued. As the disease advanced a thin, watery fluid flowed from the mouth even during sleep, & the breath became unsupportably fetid. As in the other varieties the neighbouring cellular tissue or lymphatic glands were much swollen. The appearances presented are however not always so severe, for the disease may be limited to the gums surrounding a carious
tooth or to the tongue, opposite one & it may remain in this state for several months gradually wearing itself away without any other part being attacked.

The epidermis has been seen to extend to the conjunctiva but this is rare.

It has been seen in on the vulva, anus, abrasions of the skin, ulcers & blistered surfaces. In some cases the ulcerated skin has been first attacked & afterwards the throat.

Cases are however recorded where the surface of the body has been the only seat of the disease.

When an ulcer is attacked it becomes very painful & forms out a large quantity of fetid matter & is soon covered by a grey flabby membrane. The edges become pustular & of a deep red colour. If the epidermis alone has been removed as by a blister the surface is rapidly covered with a false membrane.

Around the affected part the skin assumes an irregular outlines appearance & vesicles which soon become confluent, form on it. These vesicles burst & allow the cutis underneath to be seen overlayed by a false membrane.
Butaneous diphtheria always extends in the direction of the depending parts, as for instance it may begin on some excretions on the back of the scalp & gradually spread to the lungs. The layers of exudation in immediate contact with the skin retain their white appearance but the more external become gray & even blackish & exhale a most offensive odour like true gangrene. Gangrenous has occasionally taken place but this is of rare occurrence.

An erythematous eruption occasionally accompanies diphtheria but by no means commonly. In some cases it has attended the eruption of typhoid fever, in others it has been a merely rash, erythema multiforme or urticaire.

Haemorrhage to a considerable amount sometimes occurs from the affected parts in severe cases & is always a very dangerous symptom as it tends still further to reduce the patient's strength & renders him more liable to die under a disease which is so generally characterized by a loss of the blood-making power.
In cervical glands rarely suppuriate. Boitomeau mentions only two metastases which came under his notice & compared the appearances to those seen in Maha.

Albuminuria was first noticed by Dr. Nadezko in an occasional concomitant of diphtheria & his observations have since been confirmed by others. When present it appears from the commencement of the disease & usually disappears as the patient recovers. It does not appear to bear any relation to the severity of the diphtheria as some of the worst cases have passed through their course & no albumen could be detected in the serum, while in mild cases it has been found present to a considerable extent. Aspersion or uraemic poisoning has not been observed to occur in any instance in connection with this form of albuminuria.

The manner of death in fatal cases of diphtheria is usually by asthenia, apnoea or by dysphagia. Haemorrhage from the gangrenous ulceration & drying up a large ulcer has sometimes been the cause, but very rarely.
Patients recovering from diphtheria have generally a very protracted convalescence from the extraordinary anaemia left by the disease. They are also very liable to suffer from various affections. Three sequela are, Paralysis of the left Palate rendering the Voice to be hoarse & interfering with deglutition, Paralysis of the muscles of the back, Paralysis, Hemiplegia, Dimness or Partial loss of Vision, & deafness. These phenomena seem to depend on some functional disorder of the nervous system, not on any organic lesion as they gradually disappear in the course of a longer or shorter period varying from two to six months.
A. J. Percevaux was at first inclined to believe that cold & moisture exerted some influence on the development of diphtheria, as Louis Th“ur, when he saw an epidemic raging, observed the town situated in the middle of a valley watered by two rivers.

A more extended investigation soon however convinced him that the opinion was erroneous as he found diphtheria raging with equal fury in the towns & hamlets of the department of the Loiret which are remarkable for their salubrity & excellent position while some villages of the Lozère situated among marshes remained entirely free. Besides some hamlets & towns situated on the banks of rivers were depopulated by the epidemic while others enjoyed a perfect immunity.

As regards the habits of the population he found that in the Communes covered with vines & rich harvests, in the Viennois, in the Orléanais, & in Berry one tenth of the population was carried off while in poorer Cantons few losses were experienced. But the opposite was also seen.

Hygrometrical, thermometrical & barometrical
influences gave me better explanations as to its appearance, cause, and disappearance of diphtheria. For whilst in 1825 a year remarkable for its severity, some comunnes situated in the north of Orleans were ravaged by the epidemic, it was ascertained that the commencement of maximum mortality of the disease in one comunne did not occur at the same time as in the neighbouring comunne placed under the same conditions. On the other hand in the year 1828 which was not very hot & rather rainy, diphtheria was found to number in the South of Orleans, as many victims as it had made in the north in 1825. M. Biscain found on consulting the tables of mortality of the different villages which had been attacked by the disease, that the first deaths coincided in one case with the commencement of winter, in another with the passing days of spring, & in a third with the middle of summer.

M. Foulcaud's observations have been confirmed by what has been seen in England. It has not been due to any known climatic or meteorological laws but has raged in parts of the country differing in
every respect as its indulgence & with equal pertinacity during all the seasons of the year.

Suffolk has been said to attack by preference the poor who have to live crowded together in hovels where the air is almost constantly loaded with putrid effluvia. The following cases taken from a number collected by Dr. Greenhow will show that that opinion is ill-founded, as no connection can be traced between a want of sanitary precautions & the spread of severity of the disease.

At Moseley, on the first floor, three deaths occurred in a gamekeeper's cottage around which no nuisance was observable. While at the other end of the village, the children of two miserable-looking cottages, partially surrounded by fields, were not attacked at all.

At Can near Dudley in Worcestershire the epidemic was very mild. It attacked inhabitants of the best & the worst descriptions of houses. Among the places he visited was a row of cottages inhabited by weavers. The privies were not even well kept & in the garden large tubs were sunk for the purpose,
of collecting urine to be sold for scouring cloth. Yet the epidemic was far rarer among the weavers than among the inhabitants of a row of clean, well-situated houses at Richards Hill, separated from the mill stream by a space of neatly tended garden ground about thirty or forty yards in breadth.

At a meeting of the London Medical Society, reported in the Lancet for Jan. 22nd, 1859, Dr. Fuller mentioned the following curious circumstance with reference to the recommendation of hygienic means for the prevention of diphtheria. He had been requested to see a gentleman at a village in Hertfordshire where the disease was very prevalent. The village contained 400 inhabitants. There had been fifty cases of diphtheria and fifteen deaths. About one half of the village consisted of ill-drained, ill-ventilated badly situated and wretched houses, the other half of healthily situated model houses excellently drained and ventilated. The disease was confined entirely to the latter dwellings. The statement on life does not therefore appear to have any influence on the predisposition
to diphtheria or on the severity of the attack.

Those enjoying every comfort seem as liable to the attack as persons exposed to the peroration of hardships of poverty. At the same time persons of a weak anaemic or asthmous habit are more liable to succumb under the effects of a disease so commonly characterized by intense depression as diphtheria.

Age is the most powerful predisposing cause of diphtheria in children from two to twelve years of age are the most subject to it.

Adults are however also frequently attacked if it has been seen in persons of a very advanced age. It seldom proves so fatal in adults as in children, a greater number of the former recovering than of the latter, in proportion to the number attacked.

Professor Leggat has brought forward the theory that diphtheria is caused by the "Bdium album" a parasitic fungus which he considers may act either through the blood or locally. He looks on the membraneous exudation as not being characteristic of diphtheria & holds that it is identical with that seen in some forms of in
August of Israel. French authors hold that parasitic fungi are only found in the pseudo-membrane of diphtheria and not at all in that of true diphtheria.

Dr. Harley of London examined micros especially the false membrane in twelve cases of true diphtheria and found the bacillus present in only one case of it in that the fungus did not appear till fifty six hours after the removal of the membrane from the face of the patient.

He also examined the blood in the case of a girl who died on the 3rd day of diphtheria. It failed in detecting the presence of spores or mycelium.

Dr. Keale in his Archives of Medicine states that he has examined numerous specimens of the true diphtheritic exudation and found the fungus only once where its presence was evidently due to external means.

M. Retroux in his fifth memoir states his opinion that diphtheria is transmissible from one person to another only by inoculation or in no other manner. He gives some remarkable examples of inoculation causing the disease.
Mr. Martin expert in the Lins Hospital, while
employed in cauterizing the throat of a child
suffering from pharyngeal diphtheria, received
on the surface of his left nostril, some of the
dueta expelled by the child coughing violently, but
from his being obliged to continue the cauterization,
had no time to wash or wipe the part at once.
A few days after, he was attacked by nasal
diphtheria which extended to the pharynx. The
first affection was followed by paralysis of the
dleft palate and of the extremities, from which
he did not entirely recover for six months.
Another friend of Mr. Bretoumeau, Dr. Godinon,
in performing laryngotomy received on his lips a
dshower of the diphtheritic exudation, at the moment
of opening the trachea it was almost immediately
attacked by pharyngeal diphtheria, from which he
recovered rapidly under energetic treatment.
At the Ecole Militaire, which Mr. Bretoumeau visited
in 1826 by order of the Minister of War, one of the
pupils who had excoriated children on his toes
was attacked with cutaneous diphtheria after
breathing on the dueta of a diphtheritic patient.
Mr. Toulemon saw the breasts of a woman suffering
a child suffering from diphtheria, became the victim of cutaneous diphtheria.

In Dr. Pendergrass' paper on cutaneous diphtheria, there is a very interesting account of the introduction and course of a circumstantial epidemic of which the circumstances are briefly these. A constable who had been of the school left the farm where he was employed & went to Logan, a town about a league distant & where malignant anemia had prevailed for more than a year. He remained there while his mother & brother were ill with diphtheria & on his return to the farm the farm laborers of the school assumed suddenly a character of unusual severity. Two of the farmer's children with whom he slept died shortly after with the symptoms of diphtheria. Two other children, playmates of the last & living on another farm house close at hand came frequently to see them during their illness & in like manner died of diphtheria a few days later. One of the children who had slept with the constable was first attacked with cutaneous diphtheria of the scalp, back of the ear & on the scalp of the neck & while suffering from this
had been taken by her mother to see her great
uncle who resided in another farm house about
five or six hundred yards distant, along with his
wife, five children, a whipper-in and a cat
.
A few days after this visit, cutaneous diphtheria
appeared on the backs of the ears of one of the
children and in the course of two months, the
mother and five children were carried off by
malignant diphtheria. All of the family suffered
only from the cutaneous form.

Although these facts seem to prove that the
disease is transmissible by inoculation of
matters taken from the affected parts, still
experiments have entirely failed.

M. Proust used a razor on a false
membrane which he had just extracted
from a wound and made one puncture in his
left arm and fine or deep on the tongue & palate.
On his arm a vesicle was developed
very similar to that of vaccination, but there
was no result on the face.

Mr. Metcalf and Dr. Bailey of London both
made experiments on the lower animals and
failed entirely in communicating diphtheria.
lay inoculation.

Dr. Brompton stands alone in the opinion that inoculation is the only manner in which diphtheria can be transmitted from one person to another, most other writers agreeing that it is contagious in other ways. It is difficult to understand how the disease could have been propagated by inoculation in the following cases.

Dr. Brompton's first memoir it is stated that one of the Doctor's pupils after a severe attack of pharyngeal diphtheria went for a few days to recruit his strength in the country. During his stay one of the children of the same district died of diphtheria shortly after the mother died also of the same disease. The eldest daughter of a young woman of the neighbourhood who had nursed the poor woman, was attacked with pharyngeal diphtheria but recovered.

Hufnagel mentions the following case in his work on diphtheria. One of the pupils at a ladies' boarding-school at Witzen was considered convalescent from diphtheria though still suffering severely from the sequelae & she returned home
to an isolated farm house at Fowcesth some miles from Iltham. About a week after her return home two of her sisters were attacked & died of diphtheria. A fortnight later the family removed to Lowestoft where diphtheria did not then exist but other two of the children were attacked & died of the same disease. The malady did not extend beyond this family. Two cases illustrative of the communicability of the disease are related by Miss Simon in his report of the Medical Officer to the Privy Council for 1860. One occurred at Folkestone where no case had happened till the arrival of Isabella W. Act. 174, from Boulogne on the evening of the 2nd July, 1856, being then in an advanced stage of the disease. She died on the following day. On the 6th July Catherine W., her sister, aged 10 years, was attacked, but she had never been in France. She had always resided on the East Cliff, Folkestone in the same house to which her dying sister was brought four days previously. The other case occurred in the same house three days after & all terminated fatally. The other case was that of a schoolboy named...
from diphtheria contracted by him at Leicester where it was epidemic & arising at home in an open healthy suburb of Cheltenham, when at the time there was no diphtheria. He was received & embraced by one of his two sisters. On the fourteenth day afterwards she was attacked & suffered terribly. The other sister who did not meet her brother, helped to nurse her & was attacked a fortnight after the first sister, by the same disease with equal severity. strict seclusion from all but mother & nurse was enforced, with thorough ventilation. No other case occurred in that family.

Numerous other instances might be related in support of the theory of the communicability of diphtheria but I think the case I have quoted clearly shows that the disease has frequently appeared for the first time in a family or place shortly after the arrival of a person from an infected district. At the same time all observers agree that diphtheria is much less contagious than some other diseases as Variola or smallpox & that it cannot be conveyed from place to place by clothing or
other articles which have been in contact with
the patient.
One peculiar feature in epidemics of diphtheria has
been the remarkable manner in which they
have frequently been restricted to particular
districts or even houses. The following letter
from T. Breslau's work shows how the Case
epidemics of diphtheria may look about a
house. At Bordon in Hampshire
an entire family was swept away by the
epidemic. The house was well constructed
pleasantly situated & there was nothing in the
house itself or its immediate neighbourhood
which could be supposed to account for the
Calamity which befell its inmates. The first
death happened on the 15th March 1859 & the
second on the 9th June. The rest of the family
five in number were in good health in the
beginning of August but they all died of
diphtheria before the close of the year.
A letter in the second report of the Medical Office
to the Privy Council for 1860 relates some cases
of a similar nature which came under his
notice. In three different houses after a
Child had died of diphtheria, the rest of the family were sent from home & remained absent until all danger from infection was supposed to have ceased. In each instance they remained in good health till their return home when the disease reappeared & proved fatal.

During the prevalence of an epidemic of diphtheria, it has been frequently observed to complicate other diseases & to engraft its own character on them. This tendency has been remarked with various affections both acute & chronic, but no disease has been more frequently complicated than diphtheria, which circumstance has led some to consider the two diseases identical.

A careful consideration of the two diseases will however, I think, lead one to the conclusion that they are essentially different.

Diphtheria is an acute disease, running its course in a definite period; in many cases followed by well known sequelae. It is characterized by sore or less sore throat & by a peculiar rash which is always most abundant in the mildest cases & which terminates by a general desquamation.
of the epidemic. Albuminuria is a frequent if not constant symptom & usually appears from the 10th to the 13th day & terminates either in a few days in complete recovery or gives rise to anaemia, one of the most common sequelae.

Diphtheria on the other hand, cannot be said to run its course in any definite period as it often shows a tendency to become chronic & its sequelae as the acute anaemia & paralysis of various voluntary muscles, are entirely different from those of Carlatina. Albumen has occasionally been found in the urine, but always early in the course of the disease within the first two or three days; it has never been observed to persist to display. While epidemics of diphtheria have occurred without any eruption whatever accompanying the throat affection & when an eruption has been present, it has not shown any of the appearances of the Balatinal rash.

The throat in Carlatina frequently assumes an appearance similar to that met with in Diphtheria, but the membranous exudation has neither the lichenoid appearance nor the coherence of a false...
membrane nor has it ever been observed to propagate itself into the air passages.

In malaena also the subcapsular membrane is more or less detached & in malignant cases frequently becomes fungous, while in diphtheria there is very rarely any lesion of the true caps membrane.

A first attack of malaena generally protects against any recurrence of it in the same person, & when it recurs, the second attack is usually of a mild character.

This is not the case however in diphtheria, for it may return a second & even a third time & the subsequent lesions instead of being milder may prove fatal. Again the previous occurrence of epitaxy does not protect a person against diphtheria nor that of diphtheria against malaena. A person who has already suffered from the one disease is quite as liable to be attacked by the other with all its virulence.

The false membrane is by some considered to be coagulated mucus seuted by the follicles & by others to be the ordinary fibrinous exudation met with in inflammation. It never becomes organised like the exudation of pleurisy, but
The mineral acids shrivel up & detach it & solutions of alkaline salts dissolve it into a diffusent mucous. The most common microscopic elements found in it are epithelial cells, molecules & granules, pus cells & blood corpuscles, & micro-organisms are not agreed as to the presence of fibrillation.

The surface of the mucous membrane presents appearances which I have already described & it is difficult to state that ulceration or purpura is purely met with.
The treatment of diphtheria may be considered as medical & physical, the former being directed to the support of the patient's strength & to the use of such remedies as may act through the blood to cause the expulsion of the false membrane obstructing respiration, & the latter to the use of such local means as tend to prevent the disease spreading & cause its regeneration.

Bloodletting has been tried by opening a vein at the bend of the arm & also by applying leeches to the sides of the neck. In some cases a slight local bleeding has given relief for a short time but whenever much blood has been taken, the result has been unfavorable.

Generally speaking bloodletting is unsatisfactory from its increasing the anaemic state into which the patient is thrown by the disease. In some cases mentioned by British medical bloodletting was followed by sudden & rapid extension of the inflammation to the air passages & consequent fatal result.

Mercury was recommended by Dr. Comstock who was in New York during the epidemic then a who thought he had seen some remarkable
advantages from its use in some cases. It has since been considerably employed by French physicians but English physicians place little reliance on it.

M. Rothenauer gives it internally in the form of Colonel, a quarter of a grain to two grains every half hour or hour. Combined with this, mercurial injections externally. The results obtained by this treatment are not however such as to lead one to recommend it as a rule, for although the cachexy produced by the drug around the most painful fever for the patient's safety, it required the greatest care to obviate dissections and sequels.

Dr. Greenhow recommends ethers when the symptoms of afebrile gouty fever at the same time the use of mercury in small & repeated doses for the purpose of altering the quality of the secretion. This is exactly the same treatment as is recommended in ordinary gout, but although all acknowledge the value of mercurial, yet many doubt whether mercury possesses any power whatever over the expenditure. Certainly its action is too tardy.
to avail when Crooksh symptoms are well marked.

Emetics should be given whenever the Crooksh symptoms arise. Antimony is very effective in its effects if administered or lukehate of zinc will therefore be more useful. Emetics have also been recommended at the outset of the disease before the patient's strength is affected. But their utility at this period is doubtful.

The use of the mercuric and iron was first recommended by Dr. Phelps of Birmingham in 1858, and has since been largely employed by practitioners in this country with apparently great benefit. It ought to be given either alone in large doses proportionate to the age of the patient or severity of the case or combined with chlorate of potash. In some cases when there is a tendency to purgation, the addition of a little dilute hydrochloric acid or other mineral acid will be found advantageous.

The diet during the acute stage of the disease should consist of beef tea, milk, eggs or rich food as is most agreeable & nutritious to the patient. Whenever depression comes on it is
necessary to support the patient's strength with some spirits &c.
Sometimes the pain in the throat is so great as to prevent the patient from allowing anything to enter his mouth, in which cases emetic emetics in small quantities should be frequently administered.

In managing a case of diphtheria it is of the utmost importance to husband the patient's strength and prevent him overextending himself as many have died even after convalescence appeared established from slight muscular spasm.

The anaemia which usually continues for some time after the most urgent symptoms have disappeared, is best treated by good food, wine, trances & change of air.

Paralysis of the soft palate seems to be best treated by the local application of alluvio-foam, subcutaneous or galvanism. The other nervous sequelae as paralya &c. appear to depend on the presence of some poisonous element in the blood & not on any local lesion. They accordingly requires the use of a general tonic treatment, the patient usually recovering entirely.
after a more or less protracted convalescence. Blistering. Blistering do not appear to have any beneficial influence on the disease in the throat & are very liable to be followed by troublesome consequences from the blistered surface taking on the depletive action.

Hot fomentations & poultices externally give little or no relief & are very troublesome to the patient from having to be renewed continually. The topical treatment has been almost universally found most successful in diphtheria & various substances have been employed of which the most efficient are, hydrochloric acid, Ranfoy's concentrated solution of chloride of soda, chloride of zinc, nitrate of silver in solution, the tincture of the silver chloride of iron, alum, borax & chlorate of potash.

In the milder cases when the patient's system is little affected & the throat appears more or less with a fine varnish, a simple poultice of borax or chlorate of potash will suffice. In the severer cases though remedies are however required, but they must be used
Cautiously & Carefully

The treatment of abscess in substance may be
prevented or the affected parts of a solution of
thirty grains to an ounce of distilled water
may be applied by means of a sponge on
the end of a whalebone brochage or by means
of a camel hair brush. If the suppuration
still extends after this application or the case
has been from the start of the most serious
character, the concentrated hydrochloric acid
alone or mixed with three or four parts of
mixture has been found the most useful in
arresting its progress.

No advantage is gained by tearing away the
membrane in applying local applications, on
the contrary the gelatinous inflammation is apt
to be aggravated by it or by any other
mechanical irritation.

Nasal diphtheria should be treated by injecting
solutions of nitrate of silver, alum &c. into
the nostrils or the cutaneous form by the use
of means similar to those for the throat.

When the suppuration has extended to the lungs
as evidenced by the difficulty of breathing &
other croupal phenomena & is threatening the
patient's life by suffocation, the question arises
whether tracheotomy should be performed.
This operation has not been very successful
in this country & is therefore regarded with
little favor. In France, however, M. Bretonneau
solved five cases out of seventeen & M. Brodieau
nine out of thirty-six or about the proportion
of one out of four cases. In many of these
cases where the patient ultimately succumbed
the operation afforded great relief & prolonged
life for some time.

Robert Bird Kelley

April 1861