Thesis
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Diphtheria.

Diphtheria is an acute, specific, infectious and contagious disease occurring epidemically, endemically, and sporadically. Characterised by a specific inflammation of the mucous membrane chiefly of the commencement of the alimentary and respiratory tracts, and a rapid emaciation of ulcers or layers of fibrinous or non-organicised lymph or false membrane deposited within and upon the surfaces affected together with enlargement of the lymphatic glands. During an epidemic other mucous surfaces and wounded and scratched areas of skin are occasionally covered with a layer of lymph. Changes often take place in the kidneys, albuminuria frequently occurring at an early period. Diphtheria is sometimes followed by degrees of involution giving rise to temporary and to permanent paralysis. In the majority of cases death results from asphyxia, heart, blood-pressure and cardiac thrombooses.
Diphtheria is a synonym of the word diphtherite originally used by Botemear Farrower subsequently modified the word to diphtheria in order to get rid of the etiological doctrine of inflammation which the utter indicated. Dr. Farrow the Registary-General introduced the term diphtheria into our nomenclature.

The presence of a membranous deposit in the larynx seems to have been regarded as a morbid condition, attended with considerable danger to life from the earliest ages. About the time of Pythagoras an Indian physician described in his system of medicine a condition which is very suggestive of diphtheria. Some have supposed that Hippocrates recognized the disease more than two thousand years ago. The Lyceum or Egyptian school, described by Aristotle as probably the first distinct description of diphtheria. It describes the ulcer as deep, extensive, covered with a white membrane, foetid breath, and great suppressed. Macrobius describes a similar epidemic that occurred at Rome during the year 380 a.d. Aulus who flourished in the seventh century also described the disease. There is no description of diphtheria from the time of Aulus until Frederick described it during an epidemic which occurred in Holland in the year 1556.
D'Allou a French physician wrote a description of the epidemic which occurred in Paris about the end of the sixteenth century. Early in the seventeenth century the disease broke out in Spain when it was described by the physicians under the name of garrullo ormodus suffocans. Della Real states that he frequently saw a white membrane
in the larynx of his patients. He described the membrane as having been so tough and elastic that it could be handled and touched like moist leather, without injury to its surface. Fontana and Bonera described the disease about the same period but their descriptions were not so minute. About 1615, diphtera prevaled in Italy and Sicily. This epidemic was very fatal especially to children. Compagni and Alagatius have given us the history of the Sicilian epidemic. They state that the physicians held very different opinions regarding the nature of the disease which was called the galleon malar.
The children were first attacked, the disease afterwards spreading among the population generally, and proving very fatal. As in the present day, it described itself greatly in malignity; in the extent of the local affections, in the tendency to spread over the adjoining parts and in depth; being sometimes wholly superficial, at other times attended by much swelling and inflammation.

both of the external and mucous parts of the cheek. Sometimes the lower redness and inflammation of the surface of the palate and uvula, the glands remaining unaffected, but at other times these glands were so much swollen that they touched each other, thereby interfering with deglutition and respiration. Several who published a treatise in 1643 clearly depicted pharyngeal parasites. Pharyngeal parasites were also observed by their in 1748 and by the elder Blanche in 1749. In 1746 J. E. Black described an epidemic which broke out at Bombay in Middletown and at Greenwich. This is the earliest account we have of the disease in England. About the year 1759 an epidemic took place accompanied by the formation of a false membrane was described by Dr. Lea of Cornwall. M. Blanchard of Orleans noticed cases of malignant catarrh, which carried off the patient in twenty-four hours. Welch and Roven described the epidemic which prevailed in London in 1754. In 1765 M. F. Stone drew the attention of the profession to the queer cough which was often preceded. Michaelis of Göttingen confirmed and supplemented the observations of G. B. Price.

Drs. Rand published a treatise upon the
nature and treatment of a very fatal form of disease which prevailed in New York in 1741. In 1748 Dr. Bock of Philadelphia published a paper on diphteria and recommended a new remedy for the disease. In 1801 Dr. Baker published an essay in which he distinctly describes diphteria under the name of granae pharyngi. He gives a precise description of the false membrane found in the pharynx and trachea after death. Since that time the disease has been frequently observed and described: by Dr. Bellan in 1802; by Albion, Jumie, and Roger-Bolton in 1807; by Dufournier who published in 1816 a description of the disease epidemic which prevailed at Tours in 1815; by Dr. Abercromby in 1825.

Although isolated cases were from time to time observed it did not excite much attention until it broke out in Paris in 1853. In 1855 an epidemic at Boulogne, which was especially fatal to the infant English, excited considerable attention. From Boulogne it was reported to Folkestone in 1856 but it was not until 1862 that the disease attained very alarming proportions in this country. Between 1858-1860 the disease broke out in different parts of the country and continued very seriously prevalent until 1862. Since that time diphteria has not appeared in England with anything like the same malignancy.
biological. The existing cause is a specific contagious, and those cases which appear to originate de novo invariably arise from the air, although it may have been long dormant. The contagion principle has not been isolated, although it is highly probable that it consists of minute particles of matter which are capable of floating in the atmosphere and attaching themselves to rough surfaces. Others hold, however, to be capable of any great diffusion in the air, but it seems to pertain to places such as rooms, furniture, clothing, etc. Some desert, however, that a fungus is the essential contagion, but the relationship between the disease and the organism is very difficult to trace. Dr. Logan has shown that the germ theory explains all the phenomena of the specific fever, but while absolute proof is wanting we must depend on analogy. An instance is recorded by Dr. William Crook in which the disease remained latent for eleven months and then led to the development of the disease. This happened to a person who occupied the room in which a case of dependence had previously occurred. Dr. Roeder states that he has treated the fungus to remain dormant for four, seven, and fifteen months and then again become active, thus showing the vitality of
the disease. The experience and testimony of the most eminent medical sanitary authorities prove that the disease is much more common in rural than in urban districts. This may depend in a great degree upon the humidity of the lach or drainage of the country compared with towns. Dr. Thrushfield says—whatever causes seem to promote fungoid growth would appear to favour the incidence and prevalence of the disease, and the explanation of the comparative immunity of towns may be the presence of something in the atmosphere liminal to such growths, e.g., the presence of sulphuric and carbonic oxide both of which are produced by combustion of coal.

As a rule the disease is more frequent during the winter months, although many epidemics rage independently of season, weather, or temperature. Although there is a diversity of opinion regarding the mode whereby the contagion is diffused, it is almost certain that the distance at which the person can take effect is more limited than in the case of typhus fever or small-pox.
The most extensive class of diseases produced by impurities in the atmosphere such as influenza, typhus, typhoid, small-pox, measles, scarlatina is certainly caused by floating organic matter. Diphtheria is somewhat analogous to these as regards the manner in which it enters the system.

Manner in which Poison Enters the System.
1. By direct inoculation.

A number of physicians have inoculated themselves with diphtheritic matter taken from the secretions of patients suffering from diphtheria without being affected; on the other hand many cases of accidental inoculation have been experienced. Hendelburg and Betel claim to have grown live to diphtheria in rabbits by inoculation. Many others have performed similar experiments fuel with negative results.

2. By the surrounding air.

The atmosphere which exerts in the secretions and exhalations of the sick, may pass into the surrounding air or it may pass into the drain and sewer gas holding the germs in suspension may be afterwards respired.

3. By water, food.

There can be no doubt that water is often
The medium by which the contagion is conveyed, and it is the same with milk. In localities where diphtheria has prevailed, the drinking water has usually been found contaminated by sewage. The exact condition of the organic mischief is unknown, whether it lies in the form of insalubrable particles or microbic or dried epithelial, and fear cells to a point for future mischief, and whether this is always contained in the instances discharged or thrown off from the body, as is the case in small-pox, or is produced by some principle changes as is supposed to be the case in cholera and dysentery in a matter of doubt.

The period of incubation in diphtheria is variable. As a rule it is generally from two to three days, but as already stated the germs of the diphtheria may remain latent for weeks. The principal predisposing cause is age. The young are more liable to diphtheria than the old, as would appear from the under-noted statistics. In every thousand fatal cases the age at death was as follows:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 1 year</td>
<td>90</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>450</td>
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<tr>
<td>5 to 10 years</td>
<td>90</td>
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<tr>
<td>10 to 15 years</td>
<td>90</td>
</tr>
<tr>
<td>15 to 25 years</td>
<td>35</td>
</tr>
<tr>
<td>25 to 75 years</td>
<td>-2.3</td>
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<tr>
<td>45 years and upwards</td>
<td>-2.5</td>
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</tbody>
</table>
Infants are not exempt from the disease, for several cases are on record where infants at the breast have been attacked. As a rule the mortality is higher among females than males; although of course the constitution of each individual patient must be taken into consideration in forming a prognosis of the case.

2. Exhaustion, poverty, filth, bad hygienic conditions, social degenerance may do much to work off the disease but this is no guarantee of immunity.

3. Certain acute diseases such as measles, Scarlet Fever, Typhus, Dysentery, Trench Fever, Pneumonia.

4. Constitutional predisposition has often a marked influence. Sir W. Jenner lays great stress upon family constitution as being one of the most important elements influencing the development of the disease and determining its progress.

No theory has yet been established as to why in some years diphtheria showed burst forth and rage with a power deflecting all efforts to avert it. While at other times it attacked some solitary dwelling, departing as quietly as it came unknown and unchecked.

The attack of diphtheria causes a certain amount of prostration although not so complete as in the case of Scarlet Fever, Typhus.
Symptoms.
In describing the symptoms of diphtheria it is convenient to classify the varieties of the disease.
The following are the principal forms:
1. The typical form.
2. The mild form.
3. The malignant form.
4. The gangrenous form.
   a. Primary.
   b. Secondary.

The typical form.
During the stage of incubation the patient complains of malaise, mental depression, and bodily weakness and towards the end of this period of incubation.
The first stage of the disease is ushered in by slight cough, dry elevation of temperature which may rise to 101° to 102° in a few hours. The pulse is rapid and weak. Anorexia, sometimes dysphagia, nausea, vomiting and diarrhoea also occur. The patient frequently complains of pain in the throat, headache, giddiness, great muscular weakness and
mental depression. There is also a sense of stiffness about the neck and throat.

The skin may be hot and dry or cool and bathed in perspiration. The tongue is moist and coated with a white film. The urine is scanty in amount, pale in colour, with a slightly deposit of urate and not infrequently containing albumen thus showing that the changes in the kidneys are not due to high temperature but to the action of the poison on the kidneys. The patient complains that his throat is painful and that defluxion is difficult. The parotid and submaxillary glands are enlarged and tender and the subcutaneous veins are frequently swollen and inflamed with inflammatory products. The lymphatic glands lying at the bifurcation of the carotid, which according to Dr. Thinna are connected with the lymphatic of the soft palate are frequently enlarged at an early stage of the disease. The enlargement of the glands is in proportion to the severity and depth of the disease. In children generally the swelling of the glands is greater than it is in adults, and in healthy children the enlargement is always greater than in sick children.

On examining the throat the faucets, palate,
pillars of the fauces and posterior wall of the pharynx are observed to be swollen and turgid and of a deep red color.

Second stage. The false membrane characteristic of the disease now becomes evident. The exudation generally shows itself at first in the form of detached specks or patches of a jellylike white or grayish yellow secretion. These patches soon become black and tough and extend ni area. The false membrane is not necessarily confined to the tonsils and pharynx but it may spread either by the extension of an individual patch or by the coalescence of patches having distinct centers of origin, and it may in this manner make its appearance on the inner sides of the cheeks and lips, or it may extend along the oropharynx to the stomach. In colour, the false membrane is of a dirty brown, black or even grey appearance and with removed areas, bleeding, and elevated surface in left, on which a new membrane is rapidly formed. In some cases the mucous membrane surrounding the exudation is congested, very tender and so lacerable that the slightest touch causes hemorrhage. The exudation varies very much in texture in different cases being sometimes thick, firm, coagulable.
andelastic, at others soft, gelatinous, almost liquid, or dry, and friable.

The reddening and choppiness of the neck mucosa, which the parotid, submaxillary and sublingual glands are enlarged, hard, and tender. The tonsils and uvula of the pharynx are much swollen there is considerable difficulty in swallowing and fluids frequently return by the nose. The temperature in most cases gradually subsides to the normal extent, but sometimes remains high, and may even increase as the local process develops. As a rule it falls to normal by the fourth or fifth day although recurrence cases behave a tendency to rise after that date.

In speaking the voice has a peculiar nasal tone and when there is a cough this is frequently painful.

As patient advances to get rid of the serous secretion which is passed off by the morbid mucous membrane. The breath is excruciating, fetid and offensive from the decomposition of the morbid products in the throat. The pulse at this stage is small, feeble, and slow and the heart sounds are feeble and mistaken.
The urine is scanty and loaded with mucus and frequently contains albumen and true-oecks.

The purulent exudation instead of remaining confined to the pharynx may spread in a downward direction and attack the larynx, trachea, or even the bronchial tubes. When this takes place it usually occurs within the first three or four days from the moroseness of the disease, and the symptoms which indicate this extension are very marked. The voice becomes rough and hoarse, or that may be aphonia, and the patient speaks in a whisper. The breathing may become sudden, coarse and choky. The face is thin; the eyes prominent; the conjunctivae injected and the supra-sternal and supra-clavicular depressions are indeed marked, but within a few hours from the accession of these symptoms the patient may die apoplectically.

Supposing that the purulent exudation instead of spreading to the respiratory passage remains confined to the pharynx, the third stage now sets in and the disease pursues one of two courses; it may subside and the patient may recover; or it may terminate in death.
If the disease terminates favourably a marked improvement in all the symptoms takes place at the end of the first or at the beginning of the second week. The sloughs separate and the ulcerated surface heals up unless new ulceration takes place. Of the case proceeds favourably the swelling and thickening of the mucous membrane gradually subside; the enlarged glands shrink, diminish in size; the swelling and stiffness of the neck disappear. The temperature and pulse become normal and the patient slowly recovers.

If the case takes an unfavourable turn the patient may suffer from secondary blood poisoning with typhoid symptoms, or death may result from cardiac insufficiency and syncope.
Mild type. In this type the symptoms both constitutional and local are very mild. The patient may complain of chilliness and depression of spirits and inability to talk. The throat is painful and on examination the pharyngeal membrane may be seen. The difficulty in swallowing is not a rule, slight. In cases of this milder type recovery takes place in a few days.

Malignant depressura.
The attack is ushered in by severe rigor, head cold, delirium, vomiting and expectoration. The temperature is not high, but the pulse is small, rapid, weak and irregular, and the patient is in a state of great depression. He becomes dull and apathetic; the skin is cold and clammy; the tongue is dry, because and tremulous and hoarse appears upon the teeth.

The throat symptoms are not severe, but the secretions rapidly undergo decomposition and cause the breath to have a most intolerable fetor. Necrotic changes may occur from the various mucous surfaces, peptic ulcer appear under the membrane. The patient becomes comatose and dies; or he succumbs to an attack of apoplexy.
Gangrenous Otitis.

In gangrenous otitis, both the local and constitutional symptoms are very severe. It may begin as an ordinary attack, or may be ushered in by severe local symptoms. The false membrane spreads from the pharynx to the anterior and posterior nares. There is a foetid, acrid discharge from the nostrils which is frequently accompanied by epistaxis. The tonsils enlarge rapidly, the uvula and soft palate are thickened, the lymphatic glands at the angles of the jaw bulge, and the surrounding tissues are infiltrated with inflammatory products. Abscesses appear in the substance of the masseter, gangrene sets in and large portions of the mucous membrane are eroded. Anemia and great prostration rapidly supervene. The pulse is irregular, small and weak, and the skin is cold and clammy. Hemorrhages take place from the Greeneaud surfaces, and the patient dies from syncope, or he becomes delirious and delirious, and death results from asthenia.
Nasal Diphtheria.

Diphtheria may commence primarily in
the nasal or the nasal membrane may spread
from the pharynx. The disease generally shows
itself by a serous, purulent, and aerial discharge
from the nose, which extends to the margin
of the nostrils. It is sometimes accompanied
by severe and repeated expectorations. On
examining the nose the presence of the
nasal membrane is easily detected.

The diphtheritic exudation may spread
along the lacrimal duct and involve
the conjunctiva, and a pustular exudation
takes place on the membrane.

If the exudation spreads along the buccal cavity
under the palatine complanar of tonsil
in the ear which may be followed by
perforation of the tympanum and a
profuse discharge from the ear.

Although diphtheria in the great
majority of cases attacks either the
alimentary or respiratory tract, cases are
occasionally observed where the diphtheritic
exudation made its appearance in other
locations, such as the nose, ears, preauricular
region, conjunctiva, and mucous of
the nose and face.
The local changes are identical with those occurring in the usual seats of the disease. The affected parts are red and swollen, especially in a narrow zone surrounding the pellicle. The pellicle is white, gray or black and is adherent to the subjacent tissues. The neighbouring lymphatics and glands are swollen and inflamed. These are two or three points in the history of diphtheria which require more detailed description.

All temperature is never a constant feature and is rarely high. In some cases except during the first day or two it seldom exceeds the normal, in other cases especially when the trachea and larynx are involved it may reach 103° or 106°F.

The false membrane is an almost invariable phenomenon of diphtheria. There are only two classes of cases in which it may be absent, i.e., those in which death from blood poisoning occurs before the encrustation has time to form, and those in which the local process is not severe enough to result in the formation of a definite membrane which resembles that of scarlet fever has been observed in a few cases.
Laryngeal Diphtheria

When diphtheria attacks the respiratory passages, it may commence in the larynx, trachea, or bronchial tubes. When the larynx is affected the patient becomes hoarse and sometimes so much so that he can scarcely be heard. The cough is rough, low, and ineffectual; inspiration is greatly embarrassed and expiration produces a harsh, roaring sound, and symptoms of laryngeal cough are rapidly developed.

On laryngoscopic examination the irritation will be observed about the epiglottis, the aryepiglottic folds and arytenoid cartilages. Few persons recover when diphtheria attacks the air passages; but sometimes mucus of the larynx, trachea, and bronchial tubes is expectorated with immediate, though often temporary relief to the patient, who frequently succumbs from a renewal of the irritation; if the case is to terminate in death the breathing becomes more and more embarrassed, the lips become blue and colourless and the nails become blue; the pulse becomes quicker and weaker, and the patient dies expiring and hopeless to coma, except by exhaustion.
Diagnosis.

The prevalence of the epidemic and history of exposure to theoccus may assist in forming a diagnosis. The disease is ushered in with cough, fever, swelling of the submaxillary glands, sneezing of the throat, difficulty in swallowing and factor of breath. The palate, faucies, and pharynx are coated with a grayish white membrane which when removed leaves a raw and bleeding surface. The membrane, however, is quickly renewed. Along with these signs there are great depression of strength, a quick small pulse, nothing owing thirst and loss of appetite.
It is important that diphtheria should be distinguished from the following:
I. From catarrhal affections.

In diphtheria the swelling of the fauces is more uniform but less diffuse than in catarrh, the fauces are more humid, one side more affected than the other and the lymphatic glands at the angles of the jaws are enlarged.

II. From tonsillitis.

In tonsillitis the inflammation either subsides or passes into suppuration and thus removes all cause of difficulty.

III. From Erysipelas of the fauces.

In erysipelas as in diphtheria the mucous membrane is of a dusky appearance, the muscles of the pharynx and palate are frequently paralyzed and fluids are apt to return by the nose. But the difficulty in deglutition differs from that of diphtheria in being present from the onset, and is not attended with enlargement of the glands of the neck, or with the formation of faecal membrane.

IV. From antici white patches which are apt to appear on the fauces.

a. Accumulations of mucus.
b. Light superficial ulcerations of a grey colour but the glands are not enlarged.
c. Herpetic eruptions.

d. The whole membrane of redunc albitans

On close examination in these cases the difference is evident.

I. From Pseudo - Diptheria.

In pseudo - diptheria the onset is sudden and is usually one sided at first. The tongue is swollen and congested and patches of a grayish yellow membroaneous exudation are seen on their inner surfaces, the membrane is less tenacious and tough than that of diptheria, the cervical glands are not enlarged, the nasal mucous membrane is unaffected, there is no albumen and the attack is not followed by sequelae.

II. From Group.

As to the identity or non-identity of group and diptheria much discussion has arisen, but the majority of observers agree that the only proof of likenes is the occurrence of a fibrinous exudation about the air passages in both. Some observers, as Dr. Johnstone and others, upheld or to a lesser opinion that group, accompanied by false membrane on the cartler of fauces, is always diptheria; in fact that the only disease characterized by the formation of a false membrane is diptheria. Others again will whose Lopez, long with Jenner, that there are two distinct
forms of cæsalations— one diphtheritic, the other erysipelas. He gives the following reasons for considering them to be distinct diseases: Because there is no evidence to show croup to be more than a local disease, whereas in diphtheria there is: (2) There is no evidence of contapan in croup, in diphtheria there is; (3) There is no evidence to prove that croup occurs in widespread epidemics, or that it affects a large number of adults, or that it is accompanied by albumenuria, or followed by nervous disorders, whereas all these occur very constantly in connection with diphtheria. My own reasons for considering croup and diphtheria to be distinct diseases are as follows: (1) They differ so to rule and the direction in which the cæsalation tends to spread; the diphtheritic cæsalation usually commences on the tongue, pharynx, or fauces, and spreads downwards towards the trachea; that of croup commences in the trachea or larynx, and, if it spread at all, it does so upwards. They differ with regard to the depth to which they respectively involve the subjacent mucous membrane. There is no distinction between them in this respect in the fauces or larynx; but on the pharynx and
tends to the ulcerous condition his quite
fire on the mucous surface, from which
it can be removed without breach of surface,
whereas the diphtheria cedation involves
the superficial layers of the mucous membrane,
and can only be removed by tearing away
there, leaving a raw bleeding surface is left. If
when fully removed, the surface formed covered
by the diphtheritic cedation is soon again
covered by a fresh and thicker cedation
than formerly, whereas, when the membrane
of croup is once removed, it is but rarely
reproduced. This is well illustrated by the effect
of an emetic in cases where the larynx is
obstructed by the false membrane
in both cases the removal of the shreds of the false
membrane is marked by great improvement, which is permanent
in the case of croup; but in diphtheria the whole matter
gradually becomes even worse than it was previous to the
emetic having been given. (4) The fever of diphtheria is markedly
of the typhoid type; whereas that of croup is more markedly
interic: convalescence from were the
initial attack of diphtheria is very slow,
whereas even from the severest case of croup history
shall the patient being almost well as soon as
the obstruction to the breathing is removed.
(5) In diphtheria,albuminuria is rarely miniscule.
present between the second and third day of
the disease, sometimes lasting for a longer time,
whereas in group it is very uncommon, although
it has been known to occur. 6) Even very mild
cases of diphtheria are often followed by
nervous sequelae, whereas in later the most
severe cases of group these never occur.

Prognosis. In diphtheria the prognosis
must always be guarded. The mortality varies,
chiefly according to the age of the patient
and the character and stage of the disease,
and these points must be borne in mind
in forming a prognosis.

The signs which indicate great danger are:
1. Appearance of freck patches.
2. Symptoms of laryngeal diphtheria.
3. White or yellow discoloration of the throat.
4. Hemorrhages from the nose, throat,
bronchial tubes and intestine.
5. Persistent vomiting.
6. Tachycardia.
7. Abnormal rise of temperature.
8. Marked diminution of temperature.
9. A brown or
blackish appearance of the face membrane.
10. Pulmonary complications such as Bronchitis,
Pneumonia.
11. Tumescent albuminuria.
14. Great prostration and rigor.
of cardiac failure: p. 6. Failure of the power of swallowing. Any one of these symptoms denotes that the case is severe, but when—as sometimes happens—two or three are combined, the patient must be regarded as in imminent danger.

Pathology.

The usual seat of characteristic pathological change in diphtheria is in the mucous membrane of the faucæ, larynx, and nares. The mucous lining of these cavities is seen to be more or less thickened and edematous. In its superficial layers an exudation has formed which, by its pressure, has caused these to become necroosed. On the fleshy surface, corresponding to the necroosed portion of the mucous membrane, a profuse fibrinous exudation is found, tough and adherent by a little force from the subjacent layers, which is kept back, the superficial layers of the mucous membrane coming away with the exudation. The上述 description is, however, only true with regard to the diphtheritic exudation on the squamous epithelium of the faucæ, larynx, and abraded skin; on the alveolar epithelium of the larynx and trachea the exudation is quite free on the mucous surface, from which...
It can be removed without any breach of tissue. It is in this situation that Manner states it to be impossible to distinguish between the epidermis of the skin and the corium by the mere fact of the epidermis replacing or not the mucous surfaces, as can easily be done on the squamous epithelium of the fauces.

The false membrane is a tough, tenacious substance resembling fibrous, or the fluffy coat of the blood. When first seen it is usually white or whitish-brown; but, by and by, it becomes discolored from the effects of decomposition or exposure, or stained by a blackish hue, probably in consequence of the blood. In other cases, the membrane assumes a buff or brownish color, very much resembling damp wax or leather, and then usually adheres very firmly to the subjacent surface. It is firm and elastic, but it breaks across suddenly when stretched. The addition of acetic acid causes it to swell up and become transparent; it is dissolved by caustic alkalis. It is insoluble in water, and yields to it neither gelatine nor albumen. It thus closely resembles fibrin in most of its qualities. The membrane may vary from a thin and transparent pellicle to a sheet of considerable
thickness, its character differing very much according to its age. In the earlier stages the different patches of membrane are more or less isolated, they are surrounded by mucous membrane in a state of intense hyperemia, they project only very slightly above the mucous surface, and they cannot be removed without considerable force. Later on the patches are found to have coalesced, they have become firmer and thicker, and individually project higher above the surrounding surface. In the next stage these edges become loosened, and show a tendency to curl up, giving the eminacan a more or less cupped appearance. Pus gradually accumulates beneath it, until it detaches itself, leaving the subjacent mucous membrane in a state of catarrh. According to the most recent researches, the eminacan in pharyngeal hypertrophica is seen under the microscope to consist exclusively of cells in various stages of metamorphoses, and armoured with the bacterium torulo. By examining a section of membrane under the microscope, it is seen to consist of the changed cells, fused together in various directions, and leaving a system of branching processes, which permeate the whole membrane.
The most superficial cells are coarse so large as lymph corporcles. They gradually decrease in size as we proceed deeper, until those which are in immediate contact with the mucous surface are almost indistinguishable from normal cells. Here and there, scattered throughout the membrane are often seen minute extravasations of blood, which originally formed on the mucous surface, had became separated from it and incorporated by successive layers of degenerated cells. In course of time the marked process comes to a standstill. The cells secreted by the mucous membrane no longer undergo the abnormal degeneration; new cells appear in increasing quantities between the mucous surface and the false membrane, and soon lead to the partial separation of the latter. The inflammation also decreases to some extent by undergoing a process of softening. The cells become granular and fatty, and the network undergoing gelatinous degeneration.

The presence of bacteria in the membranes of Megalitis is incalculable, and it can scarcely be otherwise, as air laden with germs is constantly passing over the moist and warm mucous membrane in a most favourable state for them to
Mucopurulent exudate. Some authorities, chiefly German, hold the theory that diphtheria is entirely caused by the presence of bacteria, and that as diphtheria is never found without these being bacteria present, it is without bacteria there can be no diphtheria. In my opinion, however, this seems to be carrying the germ theory to quite an extreme, as even these observers allow that it is only after the exudate has assumed a distinctly diphtheric character that the bacteria form (which they consider to be the one characteristic of diphtheria) is found, and the other forms of bacteria usually found in the mouth and spaces disappear. This seems to me to prove rather that the diphtheric membrane, in what formed, is capable of being for this special form of bacteria, than that this special form of bacteria is the cause of the special form of the exudate. The above mentioned observers support their theory of bacteria in the blood being the cause of the diphtheric exudate by stating that in the emboli sometimes found after death in the trachea of persons dead of diphtheria, the same form of bacteria is found; but its occurrence in these cases seems to me to be similar rather to the occurrence of bacterial pulmonary emboli, and to be due, in like manner,
...to their absorption along with other septic matter from the diseased surface.

Professor Siret has shown that in septicemia the blood, although septic, contains no bacteria, but that in pyaemia it does contain them; and, although some authorities dispute Siret's theory, yet his theory seems to me to explain cases of diphtheria in a way that no other does. I consider ordinary diphtheria to be analogous to septicemia, and that form of the disease which assumes a malignant character, and in which emboli containing bacteria form, to be analogous to pyaemia; in fact, complicated cases.

The parotid and submaxillary glands are frequently swollen. The cells of the acini are often swollen, and filled with a homogenous mucoid material, or replaced by quantities of small round cells. There are also frequent minute collections of pus. The lymphatic glands of the neck are almost invariably found to be more or less enlarged. In section they are redder than natural, and there is an evident increase in their cellular elements. The lesions around them which give rise to necrosis are hard, and tender, as found at the autopsy to be infiltrated with
slum and with scattered pus-cells. In protracted cases of pneumonia the muscles most severely affected are often found to be in a state of fatty or early degeneration. The bronchial tubes are usually more or less inflamed. In those cases in which the deposit of emphysema has extended along the bronchial tubes, the false membrane may be found attached to the walls or lying loose in their channels. The membrane seems to have a preference for those tubes which run in a vertical direction. The lungs are more or less engorged and edematous; there are frequently patches of pneumonia with engorged. In other cases, lobules are found collapsed from obstruction of the bronchial tubes or there may be more or less pulmonary apoplexy. The heart has often the appearance of perfect health, but, in cases where death has occurred from general blood-poisoning, its muscular texture is soft and friable, and contains scattered extravasations of blood. In other cases we may find evidences of indie,-peri-, or myo-carotico-boquea are frequently met with in the heart and extending into the great vessels. Recent observations have shown that clots in the heart may occasion the sudden death.
which are sometimes witnessed in advanced.

The brain and spinal may be perfectly normal
or they may be more or less engorged and
sometimes their cephalic present extravasation
of blood.

Glaucus and haemorrhagic vacuations may be
found both in the stomach and intestines.

The kidneys are generally swollen and engorged,
and often contain extravasations of blood. On
microscopical examination the epithelial cells lining
the tubules are found swollen and granular,
and they have often undergone extravasation producing
the rounded masses of young cells filling the
tubules and forming epithelial casts. Occasionally
the histologic twists and all tubules contain blood,
and the latter are sometimes occupied by hyaline
material.

The changes in the brain depend on the nature of death.

If the patient dies of apoplexy there isReason
engorgement of the membranes and cerebral substance
together with mucous extravasations of blood.

In some cases Willis found on making examination
of the body after death that there was more or less
thickening of the dural meninges of the spinal nerves
which he considered to be inflammation in nature.

The peculiar action of the back and the tendency to
spoke is probably due to inflammation of the
Sequela.

The principal sequela are affection of the nervous and sexual system.

Erectorea, hypertonia diarrhoea, aphonia, dyspareuna, and jaundice of the ear are rare.

In about two thirds of the cases of the first week the presence of albumen can be detected within the first few days, sometimes within the first twenty-four hours, but it may be delayed until the end of the third week. It fluctuates considerably from day to day and it may disappear and reappear several times before recovery ensues. The severity of the attack has no connection with the presence of albumen. It may be present in large quantities in cases of a mild type and absent in those of a malignant nature and vice versa. The urine is scant. Dark coloured and loaded with waste. The occurrence of albuminuric is often preceded by urine of high sp gr., which the suppression of albuminuric may fail to reduce.
On microscopical examination albuminous, degenerated nucleo-casts may be observed. The albuminuria of diphtheria is almost always a transient phenomenon, and it is quite exceptional for it to persist after recovery. It seldom recurs in diphtheria and very rarely in scarlatina.

On the 2nd October 1853 I was asked to see a girl aged 6 yrs who was suffering from headache, malaise, and swelling of the labia majora. I had attended two of her brothers for diphtheria during the month of September. The swelling of the labia had existed two or three days before I saw the patient. The labia were red, swollen, and covered with a large quantity of white membranous exudation. The temperature was 103° and there was great prostration. The quantity of the exudation presented all the characters of a diphtheritic false membrane. I ordered the child four and one-half grains of potassium nitrite, and a solution of benzoate of soda to be applied locally. On the 4th the urine presented traces of albumen which increased until the 10th when the urine became almost solid on testing for albumen by means of lead and white lead. On the 13th the face was puffy, eyelids swollen, and oedematous. There diminished in quantity.
on the 12th the eyes puffed on pressure, urine very scant.
on the 15th droopy rapidly increasing, urine almost suppressed.
on the 17th patient passed no water; body very much swollen.
on the 19th the patient suffered severely from convulsions, towards evening the patient became coma-like and died early on the morning of the 20th.
Affections of the Nervous System.

Disease is often acute, but under the most favorable circumstances, it lasts, and it is often interrupted and frequently protracted by a dormant or latent period.

In an epidemic which occurred in Paris in 1860, it was estimated that paralysis followed one-third or one-fourth of the cases; but in this country, it has been observed that only one in five individuals is affected. There is generally a distinct interval between the primary disease and the subsequent, or, as it may be called, the secondary or convulsive paralysis.

The length of the interval varies greatly; it may be only a few days, or it may be weeks or even months. In the majority of cases, it requires to manifest itself within a month or even weeks after the primary attack. The paralyzes are developed slowly and gradually, although not continuously, though sometimes by fits or attacks. They are usually asymmetrical, and may be passing, affecting a few groups of muscles, or completely expressing, more or less, the whole voluntary system. The character of the paralyzes is varied and the intensity is not always proportional to the severity of the primary disease, for they sometimes follow complications.
mild attacks of diphtheria. Nevertheless, as a general rule, it has certainly been observed that those nerve affections are more frequent after the worst cases of diphtheria, and bear some proportionable to the local severity of the attack. When the paroxysms appear within a few days after, the separation of the false membrane they are slight, and limited in extent; while, however, they do not occur until convalescence has occurred, they are severe and protracted and apt to become general. The muscles of the palate and pharynx are usually the first, and sometimes the only ones affected.

The voice is weak and thin, sibilated, and sometimes entirely lost. It is often very high pitched, and makes reeds in a flute or bell palletto voice. More frequently it is thin and husky, and the peculiar nasal twang almost miserably acquired to quite characteristic. Articulation becomes incomprehensible and sometimes unintelligible. The nasal voice and defective articulation are due to paroxysm of the palate, so that the nasal sound cannot be completely separated from the pharynx, and therefore, in place of the explosive consonants $b$, $d$ and $g$ we hear the
reasons. In, n, and ng. If we ask the patient to say rub, read and egg. The will say rum, ren and egg; but if we had his nose this alveolar articulation does not take place.

Articulation is sometimes rendered more indistinct by the presence of a knowing or rattling accessory sound dependent on a quivering of the vocal cords into contact with the root of the tongue.

In inspiration, the velum palate and uvula are soon relaxed, and although during inspiration and expiration the uvula moves backwards and forwards under the force of the current of air, the power of voluntary raising it is, to a great extent, lost. The feature is generally unilateral, and when bilateral it always affects one with much less than the other. Sometimes the movements of the tongue are not performed co-ordinately. The pharynx of the lips and tongue is often blurred, and sliding sensations similar to those produced by the application of acetone are frequently felt. The sense of taste is also generally impaired.

The difficulty experienced in the act of deglutition is also due to paralyses of the palate, along with a similar condition of the pharynx. The mucous membrane covering these parts loses its sensibility, so that it may be tickled
without mastication after action; and, from the relaxed condition of the muscles, the palate hangs down loose and flaps on deep respiration. It would press on the tongue, becomes elongated, and sometimes comes into contact with the epiglottis, causing a choking sensation. When solid food has been taken into the mouth it is masticated with difficulty; then, after being formed into a balls, and pushed back by the tongue into the pharynx, it may lodge there, the contractions failing to contract and force it onwards. Part of it may find its way into the esophagus, the paralyzed palate offering no resistance, or it may advance further in the proper direction, and cease after it has entered the gullet. Greater difficulty is experienced in swallowing fluids than solids. In some cases they always regurgitate through the mouth, in others they escape into the larynx causing violent fits of coughing in the efforts to disgorge them. Sometimes the sensibility and reflex excitation of the laryngeal muscles membrane are destroyed, and solids and fluids pass easily into the air-passage and cause serious mischief. The gullet becomes a simple tube, with seared, any contractible portion, and fluids have often to be used to wash solids down.
Paralysis of the muscles of the larynx is much less common than that of the pharynx. The whole muscular apparatus of the larynx may be involved or single muscles may be affected. In the former case, on laryngoscopic examination, the vocal cords will be seen to remain motionless, when the patient attempts to produce some sound. The voice is nearly always lost, and any considerable exertion causes dyspnoea from paralysis of the adductors. When single muscles are affected the adductors are those usually paralyzed. The muscles of the epiglottis also frequently suffer from paralysis. This is occasionally associated with drooping in the mucous membrane, in which case portions of food are more likely to make their way into the larynx than when the pharynx alone is affected.

Dysphagia of neurotic origin is of very frequent occurrence. It is often squinting, especially among children, double vision, and occasionally paralyses. In 90 cases collected by Marignac, epistaxis occurred 39 times and pharyngitis 13 times. Dusty objects are generally seen quite distinctly, difficulty only being experienced with small objects near at hand, such as ordinary print or the point of a pen with which reading. In reading, the eyes are easily fatigued.
The letters becoming indistinct, appearing to run into one another, and after a short time, none can be distinguished, only black lines crossing the page being seen. This is due to defective accommodation caused by paralysis of the ciliary muscle, which is supplied by a branch from the ructcular ganglion.

Paralysis usually affects the limbs at a very early stage; the sensibility of the skin is first affected, most frequently blunted and papilomatous; occasionally, in the worst cases, it may become anaesthetic and, very rarely, hypertrophic. Although common excitation is very rare, the appreciation of heat is in many cases increased. Both the cutaneous electro-sensibility and the muscular contractility, in response to the faradic or galvanic current, are impaired. The most frequent reactions are numbness, tingling, paresthesia, and a sense of coldness, usually commencing in the fingers and toes, and gradually extending upwards, even to the trunk, but continuing more markedly in the hands and fore-arms, feet, and legs. Sharp carminative pains are often felt in the limbs when the motor paralysis is beginning to make itself felt. The sense of touch is impaired and it becomes difficult and often impossible to feel...
up small objects such as pens. The disorders of sensation generally appear before the motor paralyses, and we are apt to prove very miserable. The muscular power begins to fail, the leg feels weak, and difficulty is experienced in walking, more particularly when the attempt is made to ascend a stair. The gait becomes uncertain and staggering; the legs are dragged along in a shuffling or jactitating manner; the muscles become flabby and relaxed; and, if the paralysis deepens, the may become quite unable to support the weight of the body, or even to be moved by the patient. Tendo-artera and joint lax indications were absorbed in four cases of definite depareptic paralysis that I attended. The arms are also affected, the grasping power of the hands is diminished and the limbs moved about in an irregular manner as if not under the control of the will. Paraplegia is common many attacks occurring that character in their letter stage; in such cases the bladder is rarely implicated, but the bowels frequently become very sluggish. When the paralysis becomes general the patient is in a perfectly helpless condition, being incapable of moving either his arms or legs. When the muscles of the neck are affected the patient is unable to raise or turn his head which falls
one side, locomotion from paralysis of the abdominal muscles may occur. In other cases there is often marked degeneration of arrect and pain from paralysis of the sphincters of the bladder and rectum.

Edema of the dependent parts often occurs, and parts occasionally lose their outline, and become gangrenous. No general reaction occurs and fever is rare.

When the diaphragm and intercostals are paralyzed the difficulty of breathing is greatly increased and the condition of the patient is critical in the extreme; while the minute respiratory muscles become paralyzed the bronchi become choked with mucus and the patient is threatened with asphyxia.

Disordered innervation of the head from paralysis of the vagus is of frequent occurrence. The pulse is rapid, small, weak, irregular, and intermittent. The patient complains of faintness, palpitation, and a feeling of great depression in the head, and death may suddenly occur. Here are very rare any mental symptoms, although the patients become low-spirited and have a vacant look.

Often continued for a period varying from six weeks to half-a-year these paralyses
as a rule, gradually disappear in the order in which they appeared, the duration being in each case proportionate to the degree of paralysis. Writers, surgeons, and physiologists, agree that the paralyses have a specific character, and consider them analogous to the paralyses which occasionally occur after severe attacks of typhus, typhoid, small-pox, and encephalitis; by others they are considered of a reflex character, due to the irritation of the peripheral extremities of the nerves supplying the part locally affected. People, peculi, bronchitis, and other beline them to be specific, and due to blood-poisoning.

Berdel considers the paralyses due to alterations first in the muscle itself (pathy degeneration), then in the peripheral nervous system, and finally in the central organs—brain and spinal cord—the faulty degeneration of the muscles being the result of general exhaustion and a reduced blood supply.

The extrinsic character of the paralyses, i.e., of motion and relaxation, the occasionally severe multiplication of the pneumogastric nerves, the usually bilateral distribution, and the fact that thefeholds (which acts chiefly on the nerve centres) of all drugs in the most potent in the treatment of paralyses.
paralyses, seem to point to a derangement of the cerebral spinal nerve centers. At the same time, the incomplete nature of the paralyses, the variability of the symptoms, and the generally favorable termination, indicate the existence, not of an organic lesion, but of a functional derangement.
Treatment.
The treatment should be prophylactic, general, and local.

Prophylactic Treatment. The physician should avoid coming into contact with the clotted blood clot or any membrane coughed up by the patient. He should warn the attendant to take similar precautions. Those who have nothing to do with the case of the sick person should keep out of the room. The patient should be placed in a large well ventilated room the air of which is fresh and warm and the temperature about 60° F.

Constitutional Treatment. The great aim should be to support the patient's strength by every possible means. If the bowels are loaded a mild purge should be given. The diet should be nutritious and easily digested. Egg yolks, milk with or without honey-water, beef tea combined with pepper should be given regularly at short intervals, and precautions should be taken that the patient was fed during the night.

But, however, as sometimes happens the patient cannot swallow food or drinks. In the administration of food by the mouth should be avoided and nourishing enterotremes administered, at the same time the
Physicians showed direct his attention to the stomach and endeavours to allay the vomiting by means of ced, cresol, carbolic acid, beemuth or opium, quinine, potassium, and hypertonic glucose should be frequently applied to the epigastrium. The administration of alcohol is very frequently called for. When the pulse is rapid and feeble it should be freely administered. In attacks of syncope occur or if the pulse becomes rapid, feeble, weak and slow, alcohol should be given in large doses. When syncope occurs or when there are signs of threatened cardiac failure the patient should be confined to bed with his head low. Leeching and blistering are contraindicated not only because they have no power to check the disease, but also because the abraded surfaces may be attacked by the decomposing mediations. If the patient suffers from diarrhoea of pneuma, bear龃, Burnett, Amido P, should be given. The patient frequently derives benefit from the local application of medicated ointments such as Peru balsam.

Of the general remedies which have been recommended in depression there are four:

1. The resuscitative agents
2. Specifics
3. The anterpeptic
4. The expectorants.
The Dr. Ferri Percol is by far the most useful medicine to use in the treatment of this disease. It takes a deservedly high place among the numerous remedies brought forward as applicable in the treatment of epidemic affections; for, when administered in answer to suitable indications, it is undoubtedly gifted with potent virtues. In administering this medicine it is necessary that it should be given in large doses and frequently repeated. The most convenient form for its administration is as a mixture containing from XXX to XL in combination with one hydrochloride in XX, in several fluid r, and water repeated every three hours. Sixty grains of chlorate of potash should be dissolved in water, and the patient should drink half of it. When the temperature rises or when the patient suffers from vertigo, vomiting, and headache, wine should be given in large doses. Morphia may be added to the diarrhea and when the patient suffers from restlessness or sleeplessness, the following are some of the medicines which were alleged to be specific: Cinchona, Bryna, and its compounds, sulphate of potash, sulphate of lithium, carbonate of potash, bichloride of licorice, bicarbonate of licorice, and the sulphocarbonates.
have been administered by many physicians with variable results. Benzacetate of soda in large doses has been given with good results when the patient suffers from any bronchial affection. Expectorants may be given.

Local Treatment.

This has varied greatly from time to time and there still exists considerable variation of opinion as to which method is most useful. Carbolic, ethyl alcohol, solvents, and antiseptics have been recommended by different observers. Bactericidal powders, fulminate, bichloride of bismuth, and others strongly recommended the application of caustics. Among the caustics which were used may be mentioned strong hydrochloric acid; nitrate of silver; sulphate of copper. They were applied once in twenty-four hours. The application of these remedies is attended with considerable pain and has no effect in controlling the spread of the face membrane.

Accidental remedies such as Ferric Acid, Gallic Acid, alum and the Ferri Percheron have been used for many years and some large doses employed. Ferric Acid, Gallic Acid, and Alum.
The heat used by maceration. The effect is increased by using them alternatively.

The Hy Fervi Preindeo may be mixed with sulphuric (3/4 to 3/7) and carefully and gently poured over the dephlegmated指的是.

Solutions. Among the solvents may be mentioned Spirit of turpentine, Bismutis lacrymalis, Leq Potassae, and Lactic Acid.

The preparations of lime may be used as a gargle or they may be applied by means of a brush or spray.

Leq Potassae (1-4) may be used in the same manner.

Lactic Acid is therefore by far the best solvent. It may be used as a gargle (m x x to 3/7) or it may be applied by means of a brush or spray (3/7 to 3/7) or it may be combined with lime water and used as above.

The melancholy of Hydrofluoric Acid gas produced by the action of sulphuric acid on flour then heated in a closed vessel has also been recommended.

Antiseptics. In the majority of cases antiseptics are useful. The best antiseptics are Carbolic Acid; Permaquale of Pottas.

Potasi Acid; Sulphuric Acid; Bencane of Salt.

Puniche...
Carbolic Acid may be used as a gargle (9:10 to 3:1) as a spray (9:20 to 3:1) and as an inhalation (9:15 to 6:8) of hot water; or in the form of tampons. Macaque, the native carbolic and ethyl iodide, may be made and applied to the false membranes. Permanaganate of Potash is most serviceable when employed at the strength of (9:5 to 3:1) followed by soda which used as liquor tincture chlorate (3:1 to 3:1).

Formalin Acid is amid anaesthetics and may be employed as a gargle (9:10 to 3:1).

Sulphuric Acid is often useful when used as an spray (3:10 to 3:1).

Bichlorate of Potash may be used at from (9:10 to 3:1 to 6:1) as a gargle.

Dimethyl sulphonate 7 hydroxệate (9:10 to 3:1) as a gargle.

Benzoate of sodium is used chiefly recommended by Dr. Nathan Brown as a gargle (3:1 to 6:1).

Hydrate of bichlorate in the form of a spray (9:10 to 3:1) and applied by means of a brush has been used by many practitioners.

In the bichlorine tincture we have a powerful anaesthetic and germicide. The following formula of the most serviceable in my experience:

Chlorine Tinctures (9:5 to 6:3) painted over the false membrane.
Dr. Gibbs of New Plymouth, New Zealand has employed Eucalyptus with success. He employed Eucalyptus steam in 33 cases in all of which recovery took place. The disinfectant was made by pouring boiling water on blue gum leaves and keeping the patient in this moist atmosphere for some days.

The local application of fresh lime juice has been recommended by Dr. Hartungkrok. Dr. Linton recommends the hypodermic injection of pelargonic. By increasing the flow of the saliva it assists the ulcera in the false membrane.

Andre has employed Resorcini in the treatment of dysenters. It is recommended as an inhalation (1/2½ to 3"

In many cases the patient will derive great comfort from frequently taking a piece of ice in his mouth. The dryness and heat of the throat, as well as the hyperaemia will be thereby materially alleviated, and the inflammation sometimes arrested.

Applying emanations applied externally to the throat are often found to relieve the pain. While the use of steam inhalations appear to exercise a favourable influence on the local process.
Treatment of Laryngeal Diphtheria.

When the larynx becomes affected irritation or a spray of the reputed solvents should be frequently employed.

In some cases emetics may be employed with advantage. As a rule, however, they should be avoided as the flesh membrane may be forced up in such a way by the act of vomiting as to obstruct the air passages. A number of cases are on record in which by the judicious administration of an emetic the flesh membrane was expelled. On account of the great risk of cardiac syncope it would be dangerous to employ emetics by which it is likely to be increased. The best emetics to employ are Opium (frr. 6, 8), Sulphate of Lime (frr. 8, 9, 10, 11), Sulphate of Copper (frr. 12, 13, 14), or a hypodermal injection of euphorbia.

Tracheotomy should be performed whenever the mucus is adherent on the cuffed parts of the thoracic paries. shows that the cause of obstruction to the entrance of air is mucus. The success of the operation, therefore, will depend on its early performance. When in addition to the difficulty of breathing the patient is suffering from apoplexy, pneumonia, bronchitis, or collapse of the lungs the operation may prolong the patient's life but will not save it.
The cases most favourable for the operation are those in which the symptoms of general infection are slight and the strength of the patient unimpaired. Also when the pulse is strong and regular; the powers of assimilation good; and the empyema though very marked is not yet too advanced that hastenomy becomes most useful. The tube should be as large as the haeoha will carry and the inner tube should be kept clear.

When the false membrane forms on other parts such as the stethi, female genitalia, the usual remedies may be employed.
In the treatment of paresis due to paralysis of the tongue, our efforts should be directed to improve the general health. Therefore change of air, diet, exercise, and good food are necessary. Strychnine and castor oil will prove useful in promoting the cure of the paresis.

When there is intense paralysis of the pharynx and respiration and the patient is unable to swallow, or, when the food fluid is too thick and is not able to flow down the esophagus, the patient must be nourished by means of the proposed tube. While the paresis is severe and extends to the extremities, the faradic and galvanic currents may be employed, but they should be applied only in a mild form. In treating cases by means of faradisation, I have observed that the more paresis is severe, the more amenable to their treatment. The loss of ability except to prove very 

When cardiac troubles arise from paralysis of the heart, the patient may derive great benefit from slight faradisation of the precordial region.

When the patient suffers from pain of the head and the bronchi become choked
With means on percussion the back and front of the chest of the patient he may be able to cough up the secretion which is blocking up the bronchial tubes.

R.Broadfoot, Authorised