Thesis for M. D. degree.

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The name Pertussis is derived from the two latin words Per - very & tussis a cough: the other well known name - Hooping Cough is doubtless derived from the peculiar hooping sound which accompanies, & latter is part of the cough.

It has also a great variety of other names in different localities by which it is known, such as Kink-hoast- tussis convulsiva - Tussis ferina - coqueluche &c.

It is an epidemic & contagious disease of the respiratory mucous membrane. It is one of the most common ailments of children, though not entirely confined to them for it may & not unfrequently does affect adults & even old people. According to best returns, in London South Among the causes of death in children under

five years of age - Pneumonia, Convulsions, & Hydrocephalus being only the more fatal disorders[1]

Clinical feature -.

It consists of three stages -

.a. The Catarrhal or Initiatory Stage

.b. The Spasmodic Stage

.c. The Terminating stage or Convalescence

In addition to these three stages, according to Tanner there is a latent stage, correspond-ing to the Incubative Stage of the Fevers for he says "......after a latent stage of perhaps six days"(2) That this is so, has not been hitherto proved; indeed I find no mention of it in any of the other medical text books, & Tanner in his work gives no statistics or other facts to prove his assertion; so that though it is extremely likely that there is a period of latency, yet this cannot be taken

(1) West. Diseases of Children. p. 407.
(2) Tanner. Practice of Medicine. 7th Edit. vol. i. p. 207.

as by any means proved.

The duration of the Catarrhal Stage varies from two days to six weeks, the more severe the case the shorter being, as a rule, this Stage. The average duration is however from ten to fourteen days.

A. Smith. says he has met with two cases, both girls over the age of six years, in whom no Spasmodic cough was noticed, in which indeed there was but one Stage namely the Catarrhal (1) This, I think, is not unfrequently the case, for in my own short experience I have met with cases which seemed to me to bear out this assertion — cases where children in a family, among whose members are a more had well-developed Hooping Cough, had had coughs which resembled Hooping cough in its Catarrhal Stage, but never [illegible]

(1) Lewis Smith. Diseases of Children. London. H.K Lewis. p. 247

assumed the distinctive features of the Second Day.

An attack of Hooping cough usually begins with Catarrh & at first there is little or no difference between it & the common cold except that sometimes the cough is attended with a peculiar whiping sound almost from its beginning. The patient suffers from Coryza, irritation of the air passages & redness of the throat. The eyes are somewhat injected & suffused. The cough is apt to occur in paroxysms & to be worse at night. This nocturnal increase of cough may, as a rule, be taken as indicating that the disease has not yet reached its height, & nocturnal decrease in severity indicates that the cough is on its decline & that the patient is getting better. An unsatisfactory

the chest. Some loud wheezing is heard: It differs in many cases, however from ordinary Catarrh, in that the fever is higher; & there is often more nervous irritability. Rousseau has known the cough to be repeated forty & fifty times in a minute." (1) Gradually the Catarrhal Symptoms disappear, but the cough continues, it gets louder & longer & becomes more suffocative. As it gets worse, its true character is made out & it passes into the -

Spasmodic Stage. This Stage may last from three a few weeks & an almost indefinite time, being in some cases very chronic: It however averages from thirty to sixty days.

It commences as a rule gradually the patient gradually passing from the first to the second Stage without any

(1) Lewis Smith. Diseases of Children. p. 247.

marked & sudden change till the well known & pathognomonic cough is accomplished. The cough occurs in paroxysms & is worst at night, at one fall at the commencement of the stage. The patient is aware from a peculiar tickling in the throat. & in some cases a sense of lightness, almost amounting to actual pain, in the chest; he has an anxious, anticipated expression in his face, he throws down his playthings & instinctively clings to something for support. In these particulars there is a striking likeness to Asthma, in both diseases is the patient forewarned of an approaching attack, in both does the patient look for firm support to help him in his trial, in fact the diseases resemble each other in many points both being, due to Spasmodic action of the

that a paroxysm is coming on.

pneumonic mechanism. If the patient be now examined, his pulse will be found to be accelerated, his respiration hurried, his temperature somewhat elevated & the surface of the body already freely perspiring. The paroxysm commences with a deep, harsh inspiration, considerably prolonged; then follow a series of short, sharp, expiratory efforts, short coughs, at first hard & dry, by degrees becoming moister, there may be as many as thirty a forty, before you fill it would seem as if every blood vessel in his body would burst, his face is deeply congested & his lips blue from the violence of these expiratory spasms: then comes a deep but very rapid inspiratory effort - the rush of air through the narrow chink of the spasmodically contracted glottis now causes the peculiar 'hoop'

which has given to the disease its name; in some cases however causes a crowing; a whistling sound; but in all there is the rapid, deep inspiratory Effort; this may end the paroxysm or the whole may be repeated three or four times, till at last a quantity of flairey & semi-transparent Mucus is brought up, & the child, not unfrequently vomits & the paroxysm is over: if he vomits, the pulse is at once raised with a craving for food: his pulse, temperature & respiration became normal he then resumes his play, & is perfectly well, in uncomplicated cases till he is forewarned, by the symptoms already mentioned, that another attack is imminent. Cullen remarks that Expectoration & vomiting usually takes place

after the second fit of coughing & usually puts an end to the paroxysm. The paroxysms may last from a few seconds to a minute or more. During its continuance, I have already noted that there is great general anxiety with blueness of the lips & lividity of the face, in addition to this there may in some cases be hemorrhage under the conjunctiva, from the nose, a form from the ears, & in some cases the membrana tympani is known to have been ruptured; the urine & fæces are often also passed involuntarily from the straining.

The hoop is, as I have above mentioned, caused by the rush of inspired air through the chink left open by the spasmodically contracted glottis. It is often a source of relief to

the anxious watchers to hear this hoop which shows that air is once more entering the lungs, the child having perhaps gone on with the short expiratory efforts till at last it would seem as if nothing could save it from suffocation, that it were impossible that it could again inspire air, till at last they cease & the air is drawn through the glottis causing a more wheezing & less distinct hoop than before, but still a hoop distinct enough to be welcome as a sign that air enters the lungs & that the child is still safe. This kind of paroxysm is however not the worst as in some extreme cases it may go on till there is complete closure of the glottis, general convulsions & death.

In the earlier paroxysms the mucus

Expelled is scanty & thin, & in proportion as this is the case the fits are the longer & more violent. By degrees the Expectoration becomes more abundant, & sometimes is very copious, at the same time it is thicker & more easily brought up & on that account the fits of coughing are less protracted."(1)

There may be only two or three paroxysms in a day or as many in a single hour. It may be called a mild case in which there are less than twenty paroxysms in the twenty four hours & a severe one in which there are as many as fifty a fifty.

Watson says, "In an uncomplicated case, if you listen at the chest during the intermissions, you will probably

(1) Watson. Principles & Practice of Physic. Vol II. p 67.

hear the sounds that are proper to Catarrh - some degree of Rhonchus & Sibilus & in some parts there may be puerile respiration, & if ~~you~~ you percuss the thorax you find the natural healthy sounds. But what happens when you apply your Ear to the chest during the paroxysms of coughing? why, the information given us in this case is very curious. You may perhaps hear between the short Explosive shocks of the cough, some snatches of wheezing or of vesicular breathing; but during the long drawn noisy inspiration that succeeds, all within the chest is silent. This is supposed to result from the slow & niggardly way in which the air passes towards the lungs through the chink of the glottis, which is spasmodically narrowed. It may also depend in part as dsemne

supposed upon a spasmodic condition of the muscular & contractile fibres of the bronchi & their branches. When the fit is at an end the ordinary sounds of healthy & catarrhal respiration are removed."(1) As to the first part of this statement, there is no doubt, in most cases a certain amount of rhonchus may be heard in the chest during the intermission even in cases quite uncomplicated. Then, Sir Thomas Watson goes on to say that during the expiratory efforts you may perhaps hear snatches of wheezing & vesicular breathing between the expiratory efforts. I have in many cases during this statement examined carefully patients during a paroxysm, to see if this be the case & it has certainly seemed to me in watching a child that it is utterly impossible

(1) Watson. Principles & Practice of Physic. Vol ij p.p. 67 & 68.

for air to enter the chest between the quick expiratory efforts, they seem to succeed one each other without any interval whatever. I have also examined the chest with the aid of the stethoscope & I have failed entirely in all cases to detect the slightest noise in the chest during the expiratory efforts. West says with reference to this point, "If you listen to the chest during a fit of hooping cough, you will hear no sound whatever in the lungs."(1) There seems every reason to believe that the noisy way in which air enters the lungs during the inspiratory hoop is due to the slow & incomplete way in which it is allowed to do so by the spasmodically closed glottis & smaller bronchi & I would further suggest the chest walls

(1) West. Diseases of Children. p 408.

for it seems to me that they have much to do with the general spasm. Watson says "all within the chest is silent" during the hoop, but, I have, in many cases, heard air passing into the lung, as West says[1], through the larger bronchi

This stage usually reaches its height in from three to four weeks after its commencement. If the under surface of the tongue be now examined, there will be found, in most cases, small ulcers in the neighbourhood of the frenum, due to the tongue grazing on the teeth during the fits of coughing.

The paroxysms often occur without any apparent special cause, but after swallowing, excitement, accumulation of phlegm &c will act as an exciting cause. The urine is in many cases

(1) West. Diseases of Children. p. 408.

Saccharine, due, it is said, to congestion of the nerve centres. That this is so in some cases, I have myself proved: I have the record of the Examinat of the urine in ten cases of Phthisis in patients whom I have attended, in three I found no trace of Sugar, in four I found traces & in the remaining three very distinct proof of the presence of Sugar.

The Cough gets worse for about a week & after remaining at its worst for about another week or fortnight, it gradually begins to improve; then the nightly Exacerbations are less severe & the fits are less frequent.

Convalescence. Gradually the cough loses its paroxysmal character, the peculiar inspiratory noise disappears, it becomes less frequent, the Sputum

becomes thicker & more purulent, till in a few weeks it gradually disappears. The period of convalescence however may in some cases be considerably prolonged by trifling causes, & in many cases a spasmodic cough remains long though the child be otherwise perfectly well. Again, from improper diet & from catching cold & from some exciting cause or another the cough may appear, though all trace of it had almost disappeared. It is more obstinate in winter & autumn than in spring & summer.

Complications - The high mortality of Hooping cough is due principally to the complications which so often, unfortunately attends it; the exhaustion of Hooping cough combined with some other complication such

as Bronchitis is too much for young children to bear & as before mentioned, the younger the child the more fatal is the prognosis. If one watches an ordinary stone attack of Bronchitis in a young child, you cannot help being struck with the extraordinary prostration which attends it, if to this be added the constant irritation of hooping cough, it is not to be wondered at that this complication, rendering the two diseases, makes the case a very serious one. According to best writers complications cause a slightly higher mortality than do those connected with the lungs, for he says "Of 35 children who died under my care of hooping cough, 17 perished in consequence of the

Supervention of Bronchitis or Pneumonia is from congestion of the brain, from convulsions coming on during a fit of coughing or from Hydrocephalus."(1)

Complications also greatly added to the difficulty of treatment, indeed in many severe cases of Hooping Cough complicated with Bronchitis & Pneumonia, nothing seems to be of the slightest use in the way of treatment, nothing seems to make any impression in the course of the disease & the little patient goes on from bad to worse with startling rapidity. I think few diseases require more skill & care in their treatment than Hooping Cough complicated

The Complications met with are -

1. Bronchitis
2. Pneumonia & Phthisis.

(1) West. Diseases of Children. p. 415.

.3. Dilatation of the Bronchi.
.4. Emphysema
.5. Collapse of lung tissue
.6. Tetanal convulsions.
.7. Clonic & Tetanal convulsions.
.8. True tubercular Hydrocephalus.
.9. Measles.
.10. Chicken-pox.
.11. Vomiting
12. Exhaustion

.1. Bronchitis. There is in most ordinary cases of Pertussis a certain amount of Catarrh of the large Bronchial tubes, but it is when this inflammatory action extends to the smaller tubes that it becomes really a serious complication. It is indicated by the usual clinical features of Capillary Bronchitis, accelerated pulse, high temperature, rapid respi-

-.ations. On auscultating the chest, Râles coarse & Sibilant are heard all over the lungs. There is Sinking in of the Infra-Mammary region, & the alæ nasi are dilated at every breath. When the Bronchitis is at it's height the cough loses more & less its Spasmodic character. This last I have carefully noted in many more cases, but Still, I think, that in most cases there, is peculiarity of the cough, there Still seems to be ~~some~~ A ~~peculi~~ kind of Spasm about it, different entirely from the ordinary cough of Bronchitis, being more a series of short coughs, with great redness of the face accompanied with a kind of Sneezing noise till the Expectoration is brought off. As in ordinary Bronchitis, after the first two days there is great secretion of phlegm

which at first mucous, gradually assumes a more purulent nature; the apnœa gradually diminishes & with this clearance of the Bronchial tubes the Spasmodic cough gradually returns & assumes its ordinary characteristics.

Bronchitis, if it be a real complication, that is to say, Capillary Bronchitis, is a grave complication & it is this & Pneumonia, which complicating Pneumonia, in great part cause it to have such a high mortality. West says "Death takes place more rapidly in cases of this kind than under any other form of affection of the lungs which comes on in the course of hooping cough"(1)

& Pneumonia & Phthisis. This, Pneumonia is another very grave complication & is indicated by much the same symptoms as in

(1) West. Diseases of children. p. 416.

Bronchitis, which kicked often leads up to it & is co-existent with it. It is difficult in most cases to distinguish in children between the physical signs of each; there is known in ~~Bronchitis~~ Pneumonia a peculiar respiratory moan & ill-defined patches of dullness may be made out a very careful percussion.

Bad cases of Pneumonia may run on from bad to worse till Pulmonary Phthisis is developed, & the little patient dies from a rapid Consumption principally aggravated by the ~~Painful~~ troublesome cough.

Phthisis, true tubercular Phthisis may however come on independently of any acute attack of Pneumonia during Hooping Cough.

3. Dilatation of the Bronchial tubes.

This is another complication which is apt to be developed during the course of a case of Hooping Cough & is sometimes permanent. It is due to two causes (1) Inflammation leading to paralysis of the Bronchial tubes. (2) Distension in connection with the fits of the Cough.

4. Emphysema. This according to Lewis Smith is "one of the most common lesions in in infants of feeble constitutions & he attributes the chief Cause of the Emphysema in these cases to the impaired Nutrition & change in the Molecular condition of the tissues, & that in severe & prolonged Pertussis the child becomes feeble & Cachectic" (1) whilst Bristowe says "it is the result of laceration of the air cells, in children

(1) Lewis Smith. Diseases of Children. p. 250

often interlobular & occasionally spreads through the root of the lung & the connective tissue of the neck." Thus it probably seldom occurs in any but weakly children & is the result of the violent Epiglottic effort made during the cough. There are two or three theories as to the actual cause of the production of this lesion, but it is out of the province of this subject to enter into them here.

5. Collapse of lung tissue. This also occurs as a complication in some cases, & according to some is a fact at all uncommon one, being often mistaken for Pneumonia. Tanner says "we are indebted to Sir James Alderson & subsequently to Dr Baily Hewitt for distinctly pointing out that when hooping cough proves fatal, it

(1) Bristowe. Practice of medicine. p. 144

generally does so, not by giving rise to Pneumonia, as has been thought, but by inducing Catarrhal inflammation of the Bronchial tubes attended with collapse of a portion of the lungs."(1) This is extremely probable, as post Mortem Examinations so often detect patches of collapsed lung, whilst during life it is very difficult to clearly distinguish in cases of Catarrhal Bronchitis whether a patch of dullness be due to Pneumonia or to collapsed lung. The Cause of this obstruction is ordinarily from the Smaller tubes being blocked up with Mucus, but there are other causes, for Sir Thomas Watson says "but there are cooperating causes, to most of which these young people are also liable. Whatever impedes the free & full indraught of air

(1) Tanner. Practice of Medicine. vol 1. p 208.

may be a co-operating cause; the spasm therefore, which narrowing the tube diminishes the supply of air; a tumid abdomen, hinders the contraction of the diaphragm; weakness of the muscles of inspiration, arising from general debility. And there is yet another accessory cause, which is peculiar to the early years of life. In the full inspiration of an adult the thorax is enlarged by the depression & by the upward movement of the inferior ribs & by the simultaneous descent of the diaphragm. But in young children, when the inspiratory act is difficult & forced, the ribs yield under the power of the contracting diaphragm, which draps them inward & thus the full expansion of the lung is limited. In this way permanent deformity of the chest

is sometimes produced. We need not wonder then that, under these circumstances more or less of pulmonary collapse should be a nearly constant phenomenon after death from hooping cough."(1) Thus it would seem that collapse of the lung is a condition very easily brought about & very easily passed over in our diagnosis, for I have seldom seen it made out & clearly diagnosed though there cannot be a doubt that, from the authorities quoted it very frequently occurs.

6 & 7. External convulsions & clonic & tonic convulsions. Convulsions also occur & are of two kinds, viz. clonic convulsions of all the muscles of the body & attacks resembling laryngismus stridulus. They occur usually in young children

(1) Watson. Principles & Practice of Physic. vol ii p. 64

who are teething & in Scrofulous children. Danger from this source attends both the onset, height & decline of the disease. The child seems more heavy & drowsy, complains of headache & the usual signs of cerebral congestion: & the fits of coughing seem to be more violent without adequate cause, than also it vomits, perhaps, independently of the cough, without obvious cause, either from the medicines one may be using & from a disordered stomach, then the attack comes on & a convulsion ensues. Either hooping cough & a fit of coughing a vomiting are independently of the cough. Bristowe says "they may be due to reflex action only & to the congestion of the brain which attends the paroxysm of cough - in other words they may be

ordinary attacks of Eclampsia a attacks resembling those of laryngismus Stridulus, respiration being arrested by Spasmodic closure of the glottis & insensibility supervening, attended with convulsive movements of the muscles of the face & eyes."(1) The former variety is the more common.

It is of great importance to form a correct diagnosis before the actual onset of the convulsion & this in many cases may be done, by the coming incidents of the case & by the general aspect of the child. With reference to this Dr Copland says, "In all cases of Pertussis, when chills, followed by burning heat of the surface; pains in the head, with obscure redness of the conjunctiva; a fixed, brilliant, glassy & peculiar appearance of the eye; unusual

(1) Bristowe. Practice of Medicine. p. 144.

redness a pallor of the face; very torpid bowels with morbid secretions; irritability of the stomach, incleanliness of the fits of coughing; aversion from light & noise; heaviness & drowsiness & languor; grinding of the teeth; a sudden starting & shocks of the body in sleep; rolling & tossing back of the head & piercing screams are observed then irritation of the brain & its membranes, which will soon pass into organic change & effusion, is manifestly present, whether there be convulsions & not. When stupor & unconsciousness has come on, with one arm waving in the air, & tossed over the head, whilst the other is paralysed, a farther advanced stage of the disease than mere inflammatory irritation & softening & effusion may be inferred." (1) The shrinkness of the

(1) Copland. Dictionary of Practical Medicine. vol ij. p 239.

complication renders it imperative on us to watch carefully the child & in most cases, we can, with great care, forewarn the friends of the onset of this dread complication.

The convulsions usually occur after a fit of coughing & are usually fatal; though in some cases death may be averted by the use of appropriate remedies. In fatal cases there is usually found to be considerable congestion of the brain & in some cases rupture of the cranial vessels with extravasation of blood.

8. The Tubercular Hydrocephalus. West says that "the tubercular hydrocephalus is rare & then met with as a complication of Hooping cough....., The danger of its supervention should never be forgotten in the case of weakly

children who have long suffered from severe hooping cough."(1)

q & 10. Measles & chicken pox. It is supposed by some that there is a peculiar relation between Hooping cough & these fevers. West says "The relation that appears to exist between it & two of the Eruptive fevers namely measles & chicken-pox..... My belief is, that the occurrence of any one of these diseases during the Epidemic prevalence of another, increases the liability of the child to become afflicted by that which is Epidemic & that an Exacerbation of the fever of hooping cough & the appearance of more than ordinary illness than the local Symptoms account for is very likely to be due to the approach either of measles or of varicella."(2) He says also that these fevers may produce

(1) West. Diseases of Children. p. 416.
(2) " " " " p. 426

not only an abatement of symptoms, but may cure the hooping cough." It is difficult to see what possible connection there can be between an eruptive fever like measles & an epidemic nervous disorder as Hooping cough is; were it not stated by such an eminent man as Dr West, one would pay little attention to it. Still in my own short experience I have been in three epidemics of Hooping cough, one at Hawick in July. 1878 in which Measles (Rotheln) was present also & two in Hawkhurst, Kent, in the Spring of 1875 & Spring of 1880 & in both these latter epidemics has measles prevailed at the same time. But the theory which I would venture to put forth in explanation

is this, that the atmospheric conditions which favour an outbreak of either of these two fevers also favours an outbreak of Hooping cough; that there can be any real connection other than this between them appears to me impossible. As to the abatement of symptoms caused by measles & varicella in a case of Hooping cough, the same thing occurs when Bronchitis & Pneumonia complicates hooping cough: but Dr West goes further & says that measles & varicella may cure Hooping cough, this is a most extraordinary statement & one that I quite fail to understand.

On the other hand I have seen intense cases of Hooping cough very much aggravated by the onset of the acute fevers & death result therefrom.

Dr Day recalls a case complicated with Phthisis & Enlarged Bronchial & Mediastl Glands in which the superventn of Measles proved rapidly fatal. He says, "The case affords a striking Example of the superventn of an acute upon a chronic affectn, & the rapid downward progress which followed it. But in the complicatn of Measles the case might have dragged on longer"(1)

Dr Hewish had a case of a child with Hooping cough complicated with Catarrhal ~~Pneumonia~~ Bronchitis, Measles were now added to the list & the poor little patient rapidly succumbed to these combined diseases.

But on the other hand I have seen cases in which Measles did seem to not only modify the hooping cough but to very greatly improve it after

(1) Lancet. p 505. Dec XIV. vol ij. 1879.

the disappearance of the fauces.

.11. Vomiting is in most cases an ordinary accompaniment of the disease; but in some cases it may become a complication, being present to an extreme degree & producing great debility & emaciation.

.12. Exhaustion, under this head I include Rickets, diseased states of the bowels &c which are brought on occasionally from the Exhaustion caused upon a long & tedious attack of hooping cough. E. Smith says in speaking of Mucous disease that hooping cough "not only interferes with nutrition while actually in progress, but also leaves behind it a chronic derangement of the bowels, which often produces extreme emaciation & may favour the occurrence of any fatal disease" (1).

(1) Eustace Smith. wasting diseases of children. p. 177.

Children also sometimes seem to die from the exhaustion of hooping cough pure & simple, the cough is so severe & so long in its duration is to completely exhaust the little patients strength.

Pathology. The pathology of hooping cough is very obscure. There are ordinary traces of the catarrhal affection of the mucous membranes of the air passages. The medulla oblongata & basis are said to be congested & the Bronchial glands are said to be enlarged with the branches of the vagus enlarged & compressed amongst them: the theory being that the enlarged bronchial glands press upon the recurrent laryngeal & some branch of the vagus, & it is suggested that these glands are enlarged from a specific poison, similar to the parotid gland in mumps. This at first sight seems a

most plausible theory, but it is also a fact that these enlarged bronchial glands are found in many other pulmonary affections, they are caused by an inflamed bronchial mucous membrane & this then forms quit sufficient cause for them being enlarged in pertussis.

It is said also that the vagus nerve is found reddened in its course & inflamed, but this is not a constant phenomenon & may be due to secondary changes & to the implication of the vagus in general inflammatory changes within the thorax during the course of hooping cough.

In fact the pathology of Hooping cough is hidden in obscurity, owing in great part to the difficulty of getting true cases of uncomplicated Pertussis to

Examine.

Generally there will be found lesions in the lungs due to complications such as congestion of the mucous membranes of the air passages & secretion into the bronchial tubes, pulmonary collapse, dilatation of bronchial tubes, emphysema, extravasation of blood within the cranial cavity & pathological changes generally, occasioned by the various complications.

Causes. It is more common in females, especially in children. It may occur in the first week of infancy, it is rare after ten years of age, but occurs occasionally to adults, as an example may be mentioned a late distinguished member of the Medical Profession who had a severe attack during the last year. It is Epidemic & Contagious but may be Sporadic. It may be carried by

fomites or by the air. The period of infection is not accurately made out, but it is worse probably during the second stage. Cold, damp weather favours its spread. An attack confers almost complete immunity from subsequent attacks. Bristowe says "It has been much discussed whether this disease is essentially nervous or a mere inflammatory condition of the respiratory mucous membrane. It seems probable however that it is not exactly either the one or the other; but that it is like other infectious diseases the result of a virus, which affects more or less the whole system, but has a special tendency to involve the respiratory mucous membrane, producing in it a slight but specific inflammatory change, to the effect of which an

the peripheral ends of the Pneumogastric nerves, the cough, with its peculiar characteristics is due. This view is confirmed by the fact, that it is evidently from the implicated mucous surface that the contagiousness of the disease is chiefly, if not exclusively emitted." (1) The real cause of Hooping cough is probably to be explained as above, but until some more definite information is obtained concerning its pathology, the cause must necessarily remain uncertain. There can however be little doubt that the disease is connected with some abnormal state of the conditions of function of the Pneumogastric nerve.

Diagnosis. The diagnosis is as a rule easy in the second stage, but it is important to diagnose it in the first.

(1) Bristowe. Practice of medicine. p. 145.

cough be very violent, the intervals of relief short & imperfect, the breathing hurried, the rest at night much disturbed & the appetite very bad [1]
Occasionally the severity & long duration of the second stage may prove fatal by Exhaustion, but it is rare, as the whole in an uncomplicated case is prone fatal. The younger the child, the worse the prognosis, so also if he be at the period of teething a be Scrofulous.

Complicated Pertussis has a very high mortality among children, the prognosis being very grave in cases complicated with severe Bronchitis a Pneumonia. Convulsions, as a complication, in either form, but more especially Internal Convulsions, are specially fatal.

Treatment. Probably there are

[1] Tanner. Practice of Medicine. Vol I p. 210.

few diseases in which more remedies have been tried & more failed than in hooping cough. It has been a fruitful field of enterprise to many quacks & consequently a fruitful field disappointment to many anxious parents.

In the First Stage the child should be carefully prevented from catching cold, should be kept in doors, if possible in one room, which should be well ventilated without being draughty, warm of a temperature of about 60°. His diet should be light. And in this Stage as in the others he should wear flannel next his skin.

Should the Catarrh which accompanies this Stage be severe, mild counter-irritation may be applied to the chest, together with Expectorant & Saline medicines. Should there be very much wheezing, it becomes necessary to give an Emetic followed by

small doses of Bromide of Potash to act as a sedative.

The second stage is the period during which active treatment is most required & is most likely to be of service. The same hygienic conditions must be observed as in the first stage, special attention being paid to keeping the child out of all draughts & from every chance of catching cold.

Many Specifics have been lauded for the cure of hooping cough. Among them being Hydrocyanic acid, Belladonna, Oxide of Zinc, Nitric acid, Asafoetida, Valerian, Cochineal, Bromide of Potassium, Bromide of Ammonium. The remedy in which I put most faith & have found most serviceable is small doses of Belladonna & tract given a little

Ipecacuanha wine & Syrup. of Squills. Trousseau gave pills containing 1/10 gr of the Extract & 1/10 gr of the leaves of Belladonna on an empty Stomach in the Morning, one every Morning. Others recommend it as above mentioned from 10 Minim doses of the Extract along with mild Expectorant Medicines every four hours.

Trousseau occasionally employed the Atropine in place of Belladonna in doses of about 1/100 gr for young children on an empty Stomach the first thing in the Morning, & then had the pills vomited during the 24 hours following. Brown-Séquard Maintained that the duration of the disease so far as the Neuropathic element is concerned might be abridged to a few days by doses of Atropine sufficiently large to produce Toxic effects. The Tincture of Belladonna may also be

fixed in doses of from three to four drops two a three times daily.

Mr A. Wrigglesworth says he "treats all cases of hooping cough solely with a solution of atropine of the strength of 1-120th gr in each minim, from infants two months old to the adult. He begins with 1-120th gr (a one minim of the solution) in children from one to four years of age, diminishing a minim each dose as occasion requires; except in very severe cases he only orders it to be given once a day; but when the nightly paroxysms are very severe, he orders half the dose to be repeated about an hour before bedtime. He sums up the results obtained by it are thus — 1. There is a steady diminution in the number of paroxysms. 2. There is a diminution in the duration of the paroxysms. 3. There is a change in the

character of the 'hoop'; as if the vocal cords were not so closely approximated. Further, if the Atropine is withheld the beneficial effects derived from it subside.[1]

I have myself seen the same result with the Extract of Belladonna, which I believe to be equally good.

Hemiyer recommends Cochineal.

De Meric strongly recommends Hydrocyanic acid, he says he "usually begins with a dose of half a Minim of the acid of the London Pharmacopoeia every 4 hours for a child of three months & so on in proportion to other children."[2] Its efficacy he thinks is increased by increasing the frequency of administration than by increasing the dose. I have tried this also & in some cases with success, but I do not value it nearly so highly as

(1) Lancet. p. 514. No xv. Vol i. 1879.
(2) West. Diseases of children. p. 434

Belladonna.

Jamus recommends Zinc Sulphate gradually increased three times a day; a Mixture of Ammonia, Ether (a Spirit of Chloroform) Morphia & Hydrocyanic acid occasionally as the paroxysms demand; & to have the Spine well rubbed night & Morning with an Embrocation of two parts of belladonna liniment, two of chloroform & twenty of Camphor a Soap liniment (1)

Hydrate of Chloral in doses of five grains to a child of three a Jour three times a day is sometimes useful.

Bromide of Potassium & better, for children, Bromide of Ammonia is also very useful. I have seen cases in which neither Belladonna nor Hydrocyanic acid had any effect, considerably benefitted by the Exhibition of these drugs in doses

(1) Jamus. Practice of Medicine. p211

of from five to ten grains.

Spirits of Chloroform is also in some cases useful.

Sulphate of Quinine is also recommended in doses of one or two grains three times daily.

Carbonate of Iron has been recommended

Nitric acid is also practised by some.

Ipecacuan is also useful here sometimes either given occasionally as an Emetic, or in doses of a grain given three or four times daily.

Alum has also been recommended in doses of from one to six grains.

If there is great relaxation at night 20 drops of Laudanum may be given, unless there is a tendency to head Symptoms.

Nitrate of Silver applied to the back of the Pharynx is sometimes of great service. It should be used of a

Strength varying from fifteen grains to two scruples to an ounce of water & applied by means of a sponge.

In some places there is a popular idea that the fumes of a gas house are beneficial. Whether this is so, I cannot tell, as I have not tried it.

If there is great dyspnoea a Mustard poultice should be applied.

There are various External embrocations amongst them being oil of amber, Roche's embrocation, Brodie's liniment & various others.

The complications must be treated in the usual way, except that with regard to Bronchitis & Pneumonia, great care must be taken not to use depressing remedies to any great extent, as the child requires more stimulant medicines, strength is with difficulty regained during Hooping cough. A mixture I have used

with great success in these cases is the following. —

Rx Vin. Ipecac. ℨiij
Ext. Belladonnae. gr 2
Tinct. Quiniae. Ammon. ℨiij
Syrup. Scillae ℨiij
Syrup Tolu ℨiij
Aq. ad ℥iij M

Ft, One teaspoonful every four hours.

In the third stage tonic treatment must be resorted to. Mineral acids & chalybeate tonics are then useful, with good food.

West says that Alum is of great service in the third stage to check the secretion, avert the vomiting & render the cough less frequent."[1]

In many cases the cough is not got rid of for many months & then the only remedy is to shake it away by a change of air, high situation being

(1) West. Diseases of Children. p 442.

usually the most beneficial with
a bracing dry air.