A treatise on the nature and treatment of hooping-cough, and its complications : illustrated by cases ; with an appendix, containing hints on the management of children ... / G.H. Roe.

Contributors

Roe, George Hamilton, 1795-1873.
University of Glasgow. Library

Publication/Creation

London : Churchill, 1838.

Persistent URL

https://wellcomecollection.org/works/f7kgwzvh

Provider

University of Glasgow

License and attribution

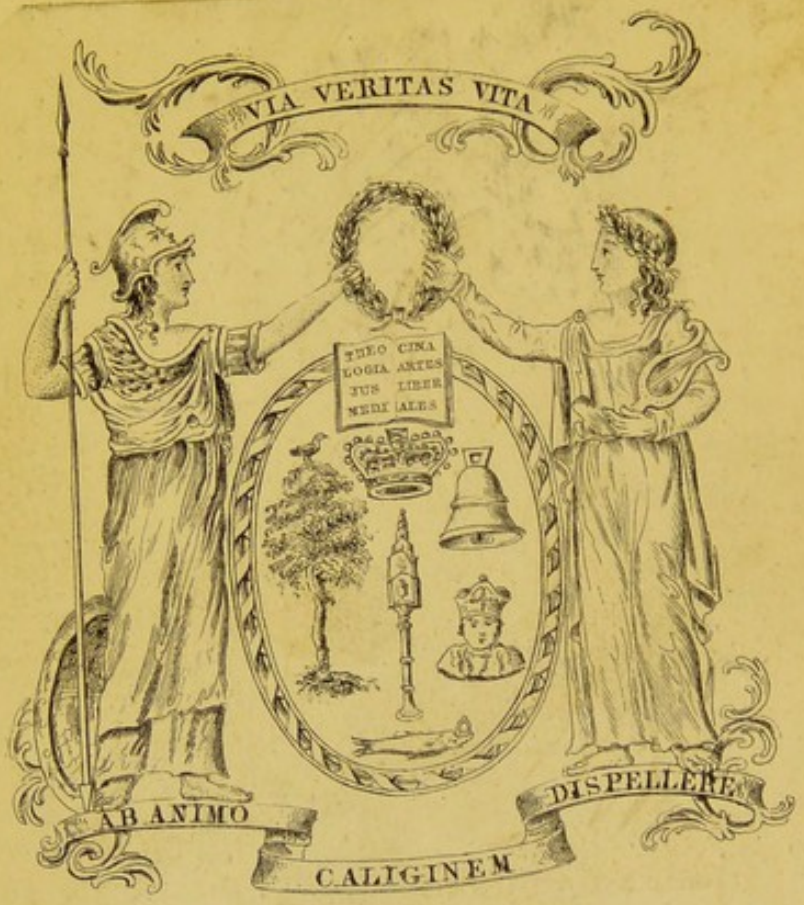
This material has been provided by This material has been provided by The University of Glasgow Library. The original may be consulted at The University of Glasgow Library. where the originals may be consulted.
This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

wellcome collection

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

STORE
G26 – d. 3



Bibliotheca Universitatis Glasguensis

L1 5 48.

9H · 5 · 24

A TREATISE

ON THE

NATURE AND TREATMENT

OF

HOOPING-COUGH,

AND ITS COMPLICATIONS,

ILLUSTRATED BY CASES:

WITH

AN APPENDIX,

CONTAINING

HINTS ON THE MANAGEMENT OF CHILDREN,

WITH A VIEW TO RENDER THEM LESS SUSCEPTIBLE OF THIS, AND OTHER DISEASES OF CHILDHOOD, IN AN AGGRAVATED FORM.

BY

GEO. HAMILTON ROE, M.D. Oxon.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,
AND PHYSICIAN TO THE WESTMINSTER HOSPITAL.

"Multum egerunt qui ante nos fuerunt, sed non peregerunt; multum adhuc restat operæ, multumque restabit. Neque ulli nato post mille sæcula præcidetur occasio aliquid adhuc adjiciendi."—*Seneca.*

"Si quid novisti rectius istis,
Candidus imperti; si non, his utere mecum."
Hor. Lib. I. *Ep.* vi.

LONDON:
JOHN CHURCHILL, PRINCES STREET, SOHO.
MDCCCXXXVIII.

C9.3.48
/205/8
28/24

T. C. Savill, Printer, 107, St. Martin's Lane.

TO

THE RIGHT HONOURABLE

THE LORD JAMES STUART, M.P.

My Lord,

I THANKFULLY avail myself of your Lordship's permission to dedicate to you the present little Treatise: and I cannot omit the opportunity it affords me of expressing the grateful sense I entertain of the interest you have on all occasions evinced for my welfare, and the many acts of kindness with which you have honoured me.

From the commencement of my professional life, your Lordship's friendship has commanded my greatest respect and esteem; but its value has been especially enhanced by this circumstance,—that it has known no change.

I have the honour to be,

My Lord,

Your Lordship's faithful Servant,

GEO. HAMILTON ROE.

Hanover Square,
July, 1838.

CONTENTS.

APPENDIX.

HINTS ON THE MANAGEMENT OF CHILDREN DURING INFANCY.

PREFACE.

FEW situations are more distressing to medical men than to be called upon to prescribe for diseases over which the medicines in general use exercise little or no control. Disease is an enemy with which they are perpetually to be at war, and one which their fellow-men, who appeal to them for succour, expect them in every instance to overcome. To be obliged to look on, therefore, whilst man's common enemy is cruelly tormenting his victim, and endeavouring to deprive him of life, without being able to render efficient assistance, is a position from which every member of the profession must naturally shrink; and accordingly, when I first found that hooping-cough pursued its course uncontrolled, or but little affected, by the remedies directed to be used against it, and witnessed the tedious sufferings of those who were attacked by it, and the permanent injury inflicted upon them by its protracted duration, I wished that I had not been consulted on behalf of persons labouring under that disorder.

Amongst the numerous patients who applied to me for advice at the Surrey Dispensary and the Westminster Hospital, many severe cases of hooping-cough presented themselves, exhibiting such great sufferings as made me particularly anxious to afford them relief. I administered the

remedies recommended by various authors, but generally found that, although they might mitigate the violence of the symptoms, they failed in cutting short the disease. I resolved, therefore, to make trial of some new medicine. Having witnessed the great benefit which many patients in St. Thomas's Hospital derived from the use of hydro-cyanic acid, prescribed for them by Dr. Elliotson, and having given it with good effect to persons affected with coughs and febrile disorders, I was induced to think it might probably prove a remedy for hooping-cough; not being then aware that any author had recommended it as such. A trial of it upon several children suffering from this disease in its simple form, was attended with such striking effects that I could not entertain a doubt that this medicine possessed a specific power over hooping-cough; under favourable circumstances the violence of the paroxysm was diminished, and its duration shortened, in three days, and the cases were cured in an average period of about fourteen days.

The most decisive proofs of its efficacy which came under my observation were afforded by its successful exhibition in two rather severe cases occurring in the children of the Hon. Mrs. M——, who were perfectly cured in seven days, and never afterwards had any return of the same complaint. Knowing the strong prejudice which was at that time entertained against this medicine, I made the lady acquainted with its properties, and asked her whether she was willing to administer it. Relying upon my advice, she consented, and her confidence was rewarded by seeing her children speedily and completely cured. This gratifying result induced her to seek the same relief for the children of one of her relatives residing at a distance from town, who had been suffering under this complaint for several

weeks. A bottle of diluted hydro-cyanic acid was accordingly sent, with directions that it should be given every four hours in doses proportionate to the ages of the children, and with instructions that it should be discontinued whenever any symptoms of debility should be observed. All the children of this family, after having taken it for a short time, were completely cured. Soon afterwards, a relative of my own who lived near Liverpool wrote to me, requesting my advice for two children who were suffering severely from this disease; I recommended her to use the same medicine, and in about a fortnight had the satisfaction of hearing that the children were quite well.

With such evidence of the power which hydro-cyanic acid possessed of curing hooping-cough, I felt desirous of making known to the medical profession the results of my observation and experience, and for that purpose I collected some of the materials, and arranged the plan, of the following treatise. In the course of my inquiries I found that Dr. Granville had pointed out the efficacy of the same remedy some years before; but as he had not done more than state the fact, I should then have persevered in my intention had I not been deterred by the strong prejudice generally entertained at that time by medical men in London, as well as by the public, against the use of this medicine.

Its introduction, however, into the Pharmacopœia lately published by the College of Physicians affords such a guarantee to the public of the safety of its exhibition, that I now do not hesitate to carry my long-purposed object into effect. More than ten years have elapsed since I first began to prescribe hydro-cyanic acid for hooping-cough; and during that period, the custom of giving gratuitous advice twice a week at my own house, and my appointments

at the Westminster Hospital, and Surrey Dispensary, have afforded me very extensive opportunities of testing its power. The result of all the trials I have made has convinced me that in warm weather it will cure almost any case of simple hooping-cough in a short time; that in all seasons it will abridge its duration; and in almost every instance, where it does not cure, that it will, at least, materially relieve the severity of the cough.

The merit of having been the first in this country to introduce hydro-cyanic acid as a remedy for this disease I believe to be due to Dr. Granville. In the first edition of his *Historical and practical Treatise on the internal Use of the Hydro-cyanic Acid*, published in 1819, he speaks of its utility in hooping-cough in, perhaps, too strong terms; but they are qualified in the second edition of the same work, published in 1820, where he expresses himself thus:—"In almost every case of hooping-cough that has not been suffered to proceed longer than two or three days without the use of the prussic acid, this medicine cautiously administered has seldom failed to remove the disease, and it is singular that children bear the action of this sedative medicine, in small doses, better than adults." Dr. A. T. Thomson and Dr. Elliotson have subsequently written upon the powers of this medicine; yet still it is evidently not generally known that it is the most valuable remedy we possess for hooping-cough. Guersent, in the article "Coqueluche," written by him in the *Dictionnaire de Médecine*, published in 1823, does not notice it, neither is it even named by Dugès in the article "Coqueluche," written by him in the *Dictionnaire de Médecine et Chirurgie pratique*, published in 1830. Dr. Johnston, the writer of the article "Hooping-Cough" in the Encyclopædia of Medicine, remarks, in a

casual manner merely, "In adults, prussic acid itself, administered with due caution, will sometimes be of use;" but he does not even give it a place in the list of remedies recommended for the cure of this disease.

These authors have enumerated in their several treatises all the medicines generally believed to be efficacious for the cure of hooping-cough, but they have not noticed hydrocyanic acid; it is therefore fair to conclude that its utility was not known to them.

As I am anxious to convince the profession generally that hydro-cyanic acid is not only an efficacious, but also a safe remedy, I have endeavoured to collect the testimony of those medical friends who have made use of it at my suggestion, and also of some benevolent persons who, having witnessed its effects when administered under my directions, have used it successfully for the children of poor persons who had not the means of obtaining medical advice. To this I may add, that though I have been in the habit of prescribing it in several other diseases as well as hooping-cough, I have never seen it in a single case do any permanent injury. The depressing effects produced by it are felt almost as soon as it is taken, and completely subside after a longer or shorter interval, according to the state of the patient; a continuance of them, therefore, can only be obtained by administering a fresh dose as soon as the influence of the preceding one begins to abate. This circumstance affords an opportunity of observing the degree of depression it has produced before danger is incurred. Should any undue depression appear, the medicine ought to be discontinued as a matter of course; since a perseverance in the use of it, under such circumstances, would no doubt be unsafe:—so also care must be taken

that it be not given in too large doses, for it is equally certain that an undue degree of depression would be occasioned by such a course. But that state of debility in a child which forbids the exhibition of remedies of this class, is so easily discerned by any one of ordinary intelligence, that I feel no apprehension in trusting the mothers of poorer children to administer it *in small doses at intervals of four hours*, for several days in succession, merely giving them a caution to desist in case an appearance of feebleness should come on. If this be done, no harm will ever ensue, for the effects of hydro-cyanic acid do not accumulate in the system like those of digitalis; where therefore a child is strong, it may be continued for any length of time without fear, unless too great depression be produced *immediately* upon its exhibition.

The success of a medicine so powerful in its effects as only to admit of being given in doses of two or three minims at a time, must obviously depend upon its strength; but the various preparations of hydro-cyanic acid differ very materially in this respect.

In a lecture on the preparation of this medicine, delivered by Mr. Everitt, the Professor of Chemistry of the Medico-Botanical Society, in the year 1834, he shewed that the preparations kept by different chemists were so unequal in strength, that the hydro-cyanic acid obtained from one shop was nearly four times the strength of that which had been obtained from another.

Having regard to this uncertainty as to its quality, and knowing that all children will not bear the same quantity, I generally begin with a very small dose, and gradually increase it, according to its effects; this I believe to be the most efficacious, as well as the safest, mode of using it.

In the lecture above alluded to, Mr. Everitt discussed the respective merits of the several formulæ laid down for the preparation of this medicine, and recommended it to be made by the decomposition of the cyanide of silver in the following manner:—

Take of diluted hydro-chloric acid nine minims,
Cyanide of silver nine grains and a half,
Distilled water one fluidounce.—*Mix.*

Shake all these in a well-stopped phial, and, after a short interval, pour off the clear liquor into another vessel. Keep this for use in a dark place.

This mixture contains two per cent. of real acid, and ninety-eight of water.

The foregoing is one of the formulæ given by the College of Physicians for preparing what is called in the Pharmacopœia Diluted hydro-cyanic acid; and it offers at least the advantage of securing to the profession a medicine of uniform strength; but Messrs. Allen, of Plough Court, have circulated amongst medical men a paper shewing, that it is little more than one-third of the strength of what they have been in the habit of selling as Scheele's preparation. It is important that this should be generally known; because, unless the dose be sufficient to produce a decided impression upon the system, it will do little or no good. Accordingly, a small dose of the pharmacopœia preparation would be of no avail in a case of hooping-cough, forasmuch as five or six minims of it are requisite, as stated by Mr. Phillips in his Translation of the Pharmacopœia, to constitute a dose for an adult. But as Messrs. Allen, and also Mr. Garden, of Oxford Street, who prepares an acid of nearly the same strength, have long enjoyed such reputation for this article that many medical practitioners take their supply of it from them, physicians and surgeons cannot but feel

very reluctant to prescribe such a dose as six minims, lest haply the acid made by these chemists should be employed, which is much too strong to be given in so large a quantity. In order, therefore, to insure a dose of efficient strength, and at the same time avoid the risk of too much being given, the more prudent course in prescribing this medicine appears to be, to adopt that quality of preparation which is sufficiently powerful to be used in *small* doses, and to guard, as far as possible, against mistake by writing in the prescription, in addition to the quantity, the word "*Scheele's.*" But, for myself, I generally request, either verbally or on the prescription, that this medicine may be obtained from one or other of the chemists above named. The very great respectability of the chemists in London as a body would have prevented me from giving this apparent preference to two particular establishments, were it not that I have often found that an attack of hooping-cough would immediately yield to the acid obtained from them, though it had previously continued unabated in spite of the same medicine procured elsewhere. Now if such a failure as this were to happen to any one who had not himself ascertained by experience the power of hydro-cyanic acid, and were making trial of it merely at my suggestion, he would most naturally conclude that this medicine did not possess the properties attributed to it, and might consequently reject it as useless. In justice, therefore, to the reputation of a remedy which I believe to be capable of preventing a great amount of human suffering, I think it right to inform my medical brethren where that preparation has been obtained which has proved effectual in most of the cases reported in the following Treatise; and to add, that I have for a long time felt so confident myself of the specific power of hydro-

cyanic acid over hooping-cough, that whenever I have not found the complaint considerably abated within a week, I have been led to believe that the preparation used had not been good; and the event has generally shewn that this suspicion was correct.

To the general reader, who may not be so well acquainted as professional men with the dangerous nature and extensive ravages of the complaint about to be treated of, it may be interesting to see a comparative statement of the number of deaths occasioned by the different diseases of childhood, and the proportion they bear to the total mortality; whereby he will perceive, perhaps to his surprise, how prominent a place is held by this terrible disease. Subjoined, therefore, is a Table, compiled from the Parliamentary returns, of the deaths which occurred in London from the various diseases of *children* during a recent period of fifteen years, contrasted with the whole number of persons buried, *including adults*, within the same period; to which is added, a comparison of the deaths that have occurred at different periods between infancy and youth, in order to direct attention to the importance of adopting some improved system in the management of children at an early age. It will be seen that under two years of age the mortality is nearly three times as great as between the ages of two and five, and nearly seven times as great as between five and ten. This may be explained in part by the fact, that infantile diseases attack children under two years of age more frequently than at either of the other periods; but *strong* infants overcome these affections so easily that it must be greatly owing to feebleness of constitution induced by improper management, that so many are carried off in the earliest period.

THE TABLE referred to in the Preface.

Years.	Convulsions.	Still-born.	Hooping-Cough.	Dropsy of the Brain.	Small-pox.	Measles.	Teething.	Scarlet Fever.	Croup.	Thrush.	Worms	Cow-pox.	Amount of Deaths from these Diseases.	Total Mortality.
1821	2921	688	614	290	508	547	428		101	78	1	1	6177	18451
1822	2929	667	757	324	604	712	472		100	102	3		6670	18865
1823	2754	771	799	570	774	573	357		105	79	11		6793	20587
1824	2772	824	627	762	725	966	388		94	65	4		7227	20237
1825	2632	904	420	751	1299	743	408		82	59			7298	21026
1826	2588	733	674	676	503	774	309	97	90	65	1		6510	20758
1827	2645	936	767	763	616	525	503	92	124	72	2	1	7046	22292
1828	2542	1005	717	778	598	736	518	78	117	106	3		7198	21709
1829	2761	933	633	855	736	578	541	103	123	82	7		7352	23524
1830	2362	951	552	723	627	479	485	94	126	100	12		6511	21645
1831	2980	898	1738	853	563	750		143	119	113			8157	25337
1832	2075		677	858	771	675		388	100	121	6		5671	28606
1833	2140	934	1040	860	574	524	473	481	151	109	2		7288	26577
1834	1875	1009	602	682	334	528	395	523	144	90	5		6187	21679
1835	1955	966	652	700	863	734	445	445	167	90	13		7030	21415
Totals.	37931	12219	11269	10445	10095	9844	5722	2444	1743	1331	70	2	103115	332708

The returns from which this Table was made out further shew, that during the period from 1820 to 1830 there died—

Under 2 Years of Age.	Between 2 and 5.	Between 5 and 10.	Total under 10.	Being about	Total Mortality.
59425	20294	8644	88,363	$\frac{11}{26}$ths of the	209094

CHAPTER I.

INTRODUCTION.

Hooping-cough, formidable not only on account of the suffering and inflammations it produces, but also from giving rise to consumption, asthma, &c.—Injurious chiefly from continuing so many months—No cause for it yet generally known—Medicine which materially shortens its duration.

THERE are few diseases of infancy more formidable than hooping-cough; whether we consider the severe sufferings it so often occasions, the organic changes it frequently produces, or the permanent injury which, in many cases, it inflicts on the constitution. Every mother of a delicate child shudders with apprehension at the mention of this complaint, when she contemplates the slender form and pallid countenance of her offspring:—knowing, as she probably does, that many children have passed safely through all the other diseases of infancy, and yet afterwards have fallen victims to hooping-cough, she cannot dismiss from her mind the apprehension that this fearful malady may deprive her of the object of her tender affection. The child too, when he

feels the approach of a paroxysm, clasps his little arms around his mother's neck, and, at each momentary cessation of a cough which shakes every part of his frame, utters a piercing cry, as if to express to his sympathizing parent the severity of his sufferings. Even to an indifferent by-stander, the appearance of a child when labouring under its attack is most distressing: the skin of his whole body becomes livid; his face seems to indicate impending suffocation; and sometimes fully fifteen minutes elapse, according to the authority of Laennec,* before he can obtain any respite from continued coughing. But the convulsive cough which characterizes this disease, is not only prolonged unceasingly for a considerable time, but returns in some cases three or four times in the course of an hour, and often remains for several weeks, or even months, with little abatement of its severity. "In the worst cases," says Dr. Watt in his Treatise on Chin-cough, p. 70, "many weeks, or even months, elapse before the disorder suffers the least abatement; and the return to strength, when the patient does recover, is slow and uncertain; in many cases, after the most unequivocal signs of recovery, death has suddenly occurred; while in others, almost every fatal symptom has been present, and yet the child has recovered."

The violence with which the blood is driven, during the paroxysm, through the delicate structure of a child's frame, often forcing it through the nose, eyes, and ears, not unfrequently produces inflammation of the brain, or lungs; and hydrocephalus, or pneumonia, or both, thus roused into action, and assailing with fresh attacks a body already worn

* "La toux dans cette affection revient par accès ou quintes qui durent un quart d'heure, et quelquefois plus."—Traité de l'Auscultation, vol. i. p. 186.

out by sufferings, add their violence to the original complaint, and combine with it to deprive their victim of life.

But even should the child, after months of suffering, be enabled by the innate strength of his constitution to struggle through the disease, it will often be found that his strength and colour are gone, his person has become emaciated, and the air cells of his lungs have been distended or ruptured by the violence of the cough; thus, he may only have survived the hooping-cough to fall an easy prey to the other maladies to which it has given rise.

An emphysematous condition of the lungs is probably the most frequent organic change that this disease producesin tolerably healthy children; and the symptoms which it occasions are, a chronic cough, and constant oppression of the breathing: those in whom such a state is induced as the consequence of hooping-cough, are generally doomed to labour all their lives under an incurable asthma. It is well known that consumption often suddenly succeeds exhaustion, by whatever cause it may have been produced. Patients in whom no symptom of this disease has previously manifested itself, frequently are attacked by it immediately upon becoming convalescent from bad fevers; and mothers, whose strength has been exceedingly reduced by nursing their children, very often become its victims; in like manner, children who are much worn down by the long continuance of hooping-cough, are not unfrequently carried off by it; and scrofulous disorders of other kinds, as rickets and tabes mesenterica, attack children reduced by this disease. "In scrofulous habits," says Dr. Watt, p. 75 of his Treatise, "the disease is not so apt to prove suddenly fatal; but if it be severe and protracted, it

generally ends in some affection of the glandular system, laying the foundation of tabes mesenterica, rickets, or pulmonary consumption: when any of these affections are present at its commencement it is very apt to prove fatal, though I have seen many instances where the disease was mild even in very scrofulous families."

It is not so much by the severity of its attack as by its protracted duration that hooping-cough proves so dangerous, and produces such a train of evil consequences: to cut it short therefore, would be to deprive it so very much of its formidable character, that any remedy which could be *proved* to possess the power of doing so would be received with great satisfaction by all practitioners of medicine. None of the medicines hitherto prescribed for this disease are believed to possess such a power; the opinions of most of the authors who have written upon the subject are, that it will pursue its course, little affected by any means that can be employed for its cure. Dr. Willis, the first writer on this disease in this country, says, in his work De Medicamentorum Operationibus, "Though seldom dangerous, or mortal, it is apt to run its course in spite of every mode of treatment, and might be said to cease rather by time and change of air, than by remedies." Dr. Heberden thus expresses his opinion, in the chapter De Tusse Convulsivâ, p. 332 of his Commentaries:—"Multa quidem ubique jactantur hujus pestis remedia, ut fieri solet adversus morbos, quorum nulla certa remedia inventa sunt. De talibus auxiliis vetus illud nimis verum est, ὦ φίλοι οὐδεὶς φίλος:" and in p. 331, "Usu didicimus mutationem cœli maximè valere ad vim morbi leniendam et finem ejus acceleRandum." Guersent, in 1823, advances the like sentiments in the Dictionnaire de Médecine et Chirurgie, Article "Coque-

luche:"—"Mais pendant le printems et l'été, lorsque la température est favorable, il n'est pas de moyen plus efficace pour abréger la durée de la coqueluche, que de transporter les malades à la campagne lorsqu'ils habitent les villes, de les faire voyager, et changer de position, surtout en passant du nord au midi." Dr. Watt also, and Dr. Johnstone, the latest English writers on this subject, are of opinion that hooping-cough will run a certain course, and that no medicine will cut short its duration. The popular notion entertained in this country, that change of air is the only remedy for hooping-cough, is founded upon the sentiments expressed by medical authors respecting it; and so general is the conviction that change of air is the only thing which can be beneficial to children suffering from this disease, that parents consider it useless that they should have medical advice. It is no uncommon occurrence, in visiting any member of a family in which this disease is prevailing, to hear the mother say, when the distressed look of a child labouring under hooping-cough is noticed,—"It is only hooping-cough!"—meaning by this expression that the child is suffering from a disease which medicine cannot cure, and therefore there is no use in trying to do anything for him.

Now the object of the following treatise is to shew, that the recommendation of Hydrocyanic Acid as a cure for this complaint given by Dr. Granville in the year 1819, was worthy of more attention than it generally received. It is much to be regretted, for the sake of the public, that, instead of incidentally mentioning hooping-cough as *one* of the diseases in which this medicine is useful, he did not furnish the profession with cases illustrative of its effects. To supply this deficiency, I have drawn up reports of a few out

of the very many cases of this disease in which I have administered Hydrocyanic Acid; and in order that a just estimate may be formed of its efficacy, I have selected the cases in which the cure has been slowest, as well as those in which it has been performed in the shortest time. Circumstances do sometimes occur which appear to render the administration of this medicine almost useless, and others which require that its further exhibition should be for a time suspended; these I shall endeavour to point out, lest by overrating its value I should cause any of my medical brethren to be disappointed in their expectations, and thus defeat my own object, of extending the knowledge of a remedy which I have found so decidedly useful in this formidable complaint.

CHAPTER II.

NATURE AND PROGRESS OF HOOPING-COUGH.

Hooping-cough, not known to the ancients— Commences generally as a cold—Comes on in paroxysms—State of a patient during a paroxysm; during the intervals—Physical signs —Duration — Mode in which it causes death—Elderly persons do not escape—How it destroys them.

To occupy time in inquiring into the origin or derivation of the term HOOPING-COUGH is fruitless labour; it is sufficient for us to know that it is an English name given to a disease in which, during a fit of coughing, a sudden inspiration produces that peculiar sound called a whoop.

The Ancients, it is generally believed, were not acquainted with this disease; though it appears to have prevailed in Britain and most of the countries of Europe for a very great length of time.

Hooping-cough sometimes commences with the symptoms of an ordinary cold, which continue for two or three weeks without attracting attention. At other times it is ushered in with the usual symptoms of an acute bronchial affection. In neither case has the cough at its very commencement

any characteristic by which it can be recognized. Soon, however, it is perceived that it comes on in paroxysms, that the expiratory efforts of coughing are made with more frequency, rapidity, and violence than usual, and that they are followed by one deep-drawn full inspiration. After a very short rest, these unusual expirations are repeated, and the forced inspiration again follows; and these continue alternating with each other until the paroxysm is ended either by expectoration or vomiting.

Very mild cases of the disease retain this character throughout their whole course, and the whoop may never be heard. I have met with several instances in which one child in a family who were suffering from distinctly-marked hooping-cough, went through the disease without hooping, and others in which the whoop was never heard more than once. Dr. Watt mentions that he had met with similar cases, and refers to observations made by Dr. Cullen and Mr. Burns to the same effect. The former writes, "I have had instances of a disease which, though evidently arising from chin-cough contagion, never put on any other form than that of common catarrh." Mr. Burns says, "In young children even death may take place, although the disease never fully forms." Were it more generally known than it is at present that the disease may exist unaccompanied by a whoop, parents would not wait till this symptom appeared before they made any attempt to arrest its progress. But now, from a desire to avoid all uncertainty as to whether their children have really passed through this complaint, they are unwilling that remedies should be administered to them until a whoop has been heard; and thus the time when the disease may be most easily cut short by medicine passes away.

When, however, the complaint takes its ordinary course, and the paroxysms are fully established, the catarrhal and febrile symptoms usually abate, though in some cases they continue throughout the disease; whereas the cough gradually becomes more violent; and about two or three weeks from its commencement, with each full deep-drawn inspiration, the peculiar sound is heard from which it derives its name. The cough is at first dry, and the fits of coughing are then long and distressing. After it has continued some time, expectoration comes on, when the paroxysms become shorter and less severe. Strong exercise, laughing, or any kind of excitement, will bring it on; it is aggravated by taking solid food, or eating a hearty meal, after which the fits follow each other more rapidly, and the efforts to obtain relief by expectoration fail.

The fits of coughing continue from one to fifteen minutes: they recur at longer or shorter intervals, according to the severity of the attack; and are more frequent and violent in the night than in the day. During the paroxysm the pulse is very much accelerated, the respiratory function is completely interrupted, and, in very bad cases, the blood is forced from the nose, eyes, and ears, by the violence of coughing; the conjunctiva is tinged with blood, and the appearance of the face resembles that of a person convulsed with epileptic fits; in fact, the patient looks as if he were on the point of suffocation, and we could not suppose he would ever again recover his breath, did we not know that children seldom die in a paroxysm of coughing.

In the worst form of this complaint, the paroxysm terminates in the complete exhaustion of the patient, without any discharge whatsoever; and if he be in a weak state of health, there is some danger that it may end in either a fainting fit

or convulsion. Dr. Watt, p. 39, describes two sorts of paroxysms, according as the whoop is present or absent. "In one set of patients," he says, "we have the whoop very long and distinct; but in these the expirations are less rapid and violent, the patient seems to gasp and strain rather than cough, the face is dark coloured, the eyes are turned up, and there is generally a tendency to fainting or strangulation. The patients affected in this way are generally the very young and the plethoric." In the following page he adds, "The face becomes swollen and of a dark purple colour, the veins of the head and neck are distended as if ready to burst, and the patient gasps and has an appearance of sudden suffocation. In those violent efforts, the extremities become cold, and sweat breaks out in the forehead and temples, and blood is forced from the nose, mouth, ears, and eyes; in many cases, the patient is actually suffocated, falls into a faint, or is seized with convulsions." "Now, in the other set of patients," he remarks, "the expirations are rapid, and so very violent, that, to use the common expression, they look as if they would burst. The face in such cases is of a bright scarlet colour; the eyes fiery, and as if they would start from their sockets; but the inspirations are performed as soon, and apparently with as much ease, as if nothing were the matter. Cases of this kind occur in the older and more robust."

In milder cases, the intervals between the accessions may be of several hours' duration; but in the more intense forms of the disease they do not exceed fifteen minutes. Usually, when the fit is over the pulse gradually subsides to its natural healthy standard, the respiration becomes so easy that no suspicion could be entertained of the existence of so violent a disease, the natural expression of the

countenance is restored, the skin feels cool and healthy, and the child appears perfectly well. In some instances, fever supervenes; and in others, the disease becomes complicated with an affection of the lungs. Under these circumstances the patient exhibits the symptoms characteristic of those complaints, which will be noticed particularly in a subsequent part of the work.

The appetite is not necessarily affected in this disease. When fever is not present, the desire for food is more craving than usual, and children, if not watched, will eat a great deal too much. The bowels are generally much confined, and there is a disposition to flatulence, which greatly increases the difficulty of breathing, and aggravates the cough.

The disease is more severe in winter than in summer; and worse in exposed, than in sheltered, situations.

Hooping-cough is believed to occur but once in the lifetime of the same individual. Exceptions to this rule are said to have taken place, but they have not been substantiated; and it is certain that very few people, if any, have this disease a second time. All ages are liable to the hooping-cough. Dr. Heberden speaks of having seen it in a woman of seventy, and in a man of eighty, years of age; I have seen it in a lady of sixty-five.

According to the authority of Dr. Watt, hooping-cough is interrupted by measles, scarlet fever, and small-pox, and some other acute diseases; but more frequently by measles than by any of the others. This has not occurred in my experience; but it is a curious fact, that when patients labouring under hooping-cough are attacked with hydrocephalus, or severe inflammation of the lungs, the whoop will cease altogether till those diseases are subdued, and

will then return, and the complaint will pursue its usual course.

If the respiration be performed easily, and no permanent oppression of the breathing remain during the intervals of the paroxysms, the sounds which are heard by means of auscultation and percussion are, properly speaking, the physical signs of hooping-cough. These I shall describe in the words of Laennec, whose authority deservedly stands first in the confidence of the profession.

Physical signs.—"When we examine with the stethoscope the chest of a child labouring under hooping-cough, we find in the intervals of the kinks merely the ordinary symptoms of catarrh, that is to say, respiratory murmur, either very feeble or even wanting in some parts which yet have sufficient resonance; puerile respiration in other parts, and sometimes a little of the wheezing or of the snoring mucous râle. During the kinks, on the contrary, we only perceive the concussion communicated to the trunk by the shocks of the cough, and nothing is heard of the rhonchus, or respiratory murmur, except during the very short interval which exists between the expiratory efforts of coughing; but the whistling and prolonged inspiration which constitutes the pathognomic character of hooping-cough appears to take place entirely in the larynx and trachea. Neither the sound of the pulmonary nor of the bronchial respiration can be heard, even in those parts of the lungs where, a few minutes before and after the kink, the puerile respiration had been very perceptible." To this may be added, that the chest sounds naturally on percussing it.

Very different, however, are the physical signs if, during the intervals of the paroxysms, symptoms of inflammation of the lungs, or bronchiæ, be present. In such a case, the

general sound of the chest on percussion is dull; the respiratory murmur is loud and bronchial, with sonorous, mucous, and sibilant (or wheezing) râles in one part; in another very feeble, and accompanied by crepitation of various kinds; and altogether wanting in a third.

The duration of this disease is very variable. The mildest form usually lasts three or four months, modified in intensity according to the state of the weather and the strength of the child's constitution, and at length gradually subsides, leaving the sufferer much weakened. More severe cases last for six months; and some few children have been known to suffer from the disease for more than a year, and yet recover. After the disease has altogether ceased, an accidental exposure to cold often occasions its return, and the liability to whoop will continue for some months.

The complaint seldom destroys by its own violence; when it proves fatal, it does so by producing other diseases. The most common effect of the long continuance of the cough is, inflammation of the lungs, or bronchiæ. When symptoms of these affections make their appearance, the child can only be saved by the prompt adoption of measures calculated to remove them, for they will not subside of themselves. If the inflammation be allowed to proceed uncontrolled by remedies, the face swells, and becomes livid; panting is produced by the slightest exertion, as if the child had been running, and very few words can be uttered without taking breath, yet difficulty of breathing is not complained of: — the whole appearance of the patient presents a picture of great distress and suffering. As the disease advances, his flesh and strength visibly decline; he lies in a torpid state, except when disturbed by an attack of coughing; but if roused, he is able to answer questions,

and it is evident that the intellectual functions are not interfered with. Each paroxysm leaves him more and more debilitated; the head and chest are bathed in a continual perspiration; the breathing is scarcely perceptible; the extremities become cold; and at length, exhausted to the last degree, he sinks under the violence of a paroxysm, and expires.

The appearance and manner of a child in the circumstances which have just been described manifest such suffering and distress, that the friends are, in some degree, prepared for a fatal termination of the complaint. But there are other causes from which death may ensue, when, to the eye of the most anxious parent, the condition of the child seems every day improving. It often happens, when the cough is so slight as to attract little attention, that a child is suddenly seized with a convulsion fit, after which the cough and whoop cease altogether, and he is left in a state of insensibility. Some hours after, a second fit attacks the patient; a third soon follows; and thus they continue succeeding each other at intervals which gradually become shorter and shorter, till one of the fits puts an end to his sufferings.

Although the symptoms which precede an attack of convulsion are often so slight as to escape general observation, yet an intelligent person may, some hours at least before it comes on, perceive, by the altered look and manner of a child, that an affection of the brain is impending; and if measures be then promptly taken, the convulsion may generally be prevented. The cause of death in such cases is either congestion or inflammation of the brain, which most probably would have ended in hydrocephalus had life been prolonged.

These, strictly speaking, are the only fatal terminations which can be said to be produced by the violence and long

duration of the hooping-cough. Typhus or remittent fever is also laid down as one of the complications which render it fatal. But fever appears to be a circumstance so purely accidental, that death from such a cause can scarcely be said to be a termination of hooping-cough; it must, however, in compliance with general custom, be noticed.

Remittent fever seldom attacks a child labouring under this complaint, unless he have been improperly fed, or the state of his bowels have been neglected. As a natural consequence of inattention to these important points in the treatment, the appetite fails, the secretions of the bowels become very offensive, and the child is restless, fretful, and feverish; these symptoms are liable to exacerbation and remission in the course of the day, being milder in the morning than in the evening. The child gradually becomes weak and emaciated; a degree of delirium comes on; the continuance of the cough increases the debility; and the child dies of exhaustion, as in low fever.

Those who escape hooping-cough in childhood are generally attacked by it in after life, when the sufferings it occasions are very severely felt. The cartilaginous structure of the body has by that time been converted into bone, and has lost its elasticity; the concussions of coughing therefore give shocks to the system of which children are scarcely sensible. This happens more frequently than is generally supposed. Even in my own sphere of observation, several persons between thirty and forty years of age are at this moment suffering under this disease, and all whoop loudly. Very elderly persons sometimes sink under its violence, before it has had time to produce any organic affection. In those who are better able to contend with it, a sort of passive inflammation of the bronchial membrane, accompanied by

copious secretion, soon becomes complicated with the original disease; and if, through failure of their strength, they are unable to expectorate as fast as mucus is secreted, it will accumulate in the bronchial tubes, and cause difficulty of breathing, and ultimately death. In adults of a plethoric habit there is great danger that the violence of the cough may produce apoplexy.

Before the causes of the great variety of symptoms which manifest themselves during the course of this disease can be satisfactorily explained, we must ascertain what are all the morbid lesions of structure which have been found after death in those who have sunk under it. This information can only be derived from their post-mortem examinations. But as the experience of no single individual is likely to furnish him with proofs from dissection of every change from healthy to diseased structure which takes place during the progress of hooping-cough, we must have recourse to the reports of such examinations found in the works of the several authors who have written upon the subject. I propose, therefore, to insert in this place some of those which Dr. Watt has published in his Treatise on Chin-cough, and to add others which have been given by Laennec, Dr. Alderson, and Monsieur Blache, as well as some which I have drawn up myself of the post-mortem examinations of children who have died under my own care.

From these reports it will be perceived that the morbid lesions are of various kinds; and in order to be able to shew the connexion which subsists between those lesions and the symptoms which characterize the disease during life, I have prefaced each report with a short account of the patient's sufferings.

CHAPTER III.

MORBID APPEARANCES OBSERVED IN HOOPING-COUGH.

CASE I.

*In which the trachea and bronchiæ were affected.**

GLASGOW UNIVERSITY LIBRARY.

Janet Watt, aged four and a half years, rather plethoric, at the end of December, 1812, was seized with a cough, which, the first week in January, 1813, was distinctly perceived to be hooping-cough; but her health was as good as usual. In the second week of January she became languid and fretful. The kinks were now very distressing, returning about once an hour; each of them generally consisted of two, three, or four different attacks, separated by very short intervals. The expirations were less rapid and violent than those of her brother;† but the inspirations were long, crowing, and peculiarly characteristic of the disease. Her breathing was a little quicker than natural, but not very laborious. The pulse was about 140. The kinks were violent in the extreme; the intervals between them sometimes not being more than half an hour. The pulse was so weak as hardly to be felt. The extremities were

* See Dr. Watt's Treatise, p. 123.

† See Case III. p 20.

cold, and the face was partly of a pale and partly of a livid colour. On the 7th she seemed much worse. Her tongue, which had been white and loaded from the first, now assumed an orange or brownish colour. Her strength was so completely gone that she could hardly move a limb from one part of the bed to another. The breathing became more difficult, and the kinks still more severe, each kink consisting of three, four, or five different attacks. The hooping inspirations were all particularly long and distressing. She continued in this state for ten or twelve days, gradually becoming weaker, and died on the 31st. She had a great tendency to sleep throughout the whole course of the disease; but when roused, she was always sensible and collected.

Dissection, 25 hours after death.

The lungs were found of a purple colour, irregularly interspersed with whitish spots, slightly elevated, which were found to be owing to a mixture of mucus and air under the pleura. The lungs did not collapse, but there were no adhesions between the pleuræ. The lungs felt knotty and uncommonly firm in some places, but on cutting into them no tubercles could be detected. In some places, though their bulk was increased, they were firm, and sank in water; in others, they sunk from being collapsed, though not indurated. The pleura costalis seemed rather more vascular than common. The trachea was slightly inflamed in its internal surface, and covered with a quantity of frothy mucus, intermixed with small portions of purulent-like matter, which increased in quantity downwards, till it nearly plugged up the smaller ramifications. The abdominal viscera seemed sound. The head was not examined.

As the history of this case does not make it evident that the principal disease was in the trachea and bronchiæ, I shall add the observations which Dr. Watt makes upon it, and the comparison which he draws between the diseases which destroyed this child, and that under which his son, Robert Watt, had laboured. In the boy's case, the inflammation of the air cells and bronchiæ seemed to have been of considerable standing; the purulent-like secretion had become so abundant as to have literally filled up their whole capacity, while the inflammation on the inside of the trachea was only in an incipient state, and not covered with the inflammatory mucus. In this case, the air cells and bronchiæ were less filled, but the inflammation on the inner surfaces of the trachea was more advanced, the whole being covered with a thick coating of semi-purulent mucus. In the girl's case, the lungs could easily receive air into their cells, but the difficulty arose in transmitting it through the trachea: in the boy's case, the passage through the windpipe was perfectly patent, but the bronchiæ and air cells were occupied by another substance.—See *Dissection*.

CASE II.

In which the substance of the lungs was inflamed in a child who died under my care.

Maria Jones, aged eighteen months, a healthy-looking child, was attacked with hooping-cough in May, 1831, and applied to me at the Surrey Dispensary on the 1st of June. She hooped frequently and violently, and after the paroxysm was over appeared very weak. She went on tolerably well

till about the 15th, when her breathing became quick and distressed, and she died on the 18th.

Dissection, 40 hours after death.

The lungs collapsed a good deal. When the chest was opened, no adhesions existed between the pleuræ; on cutting into the substance of the lungs, very little fluid exuded, and the quantity of blood in them did not appear to be much more than natural; they were elastic, compressible, and contained a good deal of air; the incised surface presented a vermilion red appearance. The mucous membrane of the trachea and bronchiæ was much injected, and contained a good deal of frothy mucus; the rest of the viscera were healthy. The head was not examined.

CASE III.

*In which the substance of the lungs was principally affected.**

Robert Watt, aged six years, of a sanguine temperament, was seized with a trifling cough in the middle of December, 1812, which, about Christmas, appeared to be chin-cough. He was able to attend school till the 8th of January, 1813, when his face appeared swollen, and assumed a leuco-phlegmatic appearance; next day his breathing was observed to be decidedly affected, and his pulse quicker than natural. The pulse became quicker and harder, and continued so until the 14th, when it became weak, and rose to 160; he appeared at times to be delirious, but was relieved

* See Dr. Watt's Treatise, p. 103.

by the application of a blister to the head. In the evening of the same day, the extremities became cold; the face and hands assumed a livid appearance, and at the end of the kinks, which still continued regular, faintness and exhaustion succeeded, and he continued in a state of stupor for the greater part of the interval. At each kink he rose, with a little assistance, to his hands and knees, with his head over the bedside. At about seven o'clock he had a sort of weaker kink than usual, and expired without a struggle.

Dr. Watt in his observations on this case says, even during the kinks the inspirations were scarcely at all attended with the ordinary whoop, and seemed to be performed in as short a time as usual.

Dissection, 65 *hours after death.*

The lungs appeared to fill the whole cavity of the thorax more completely than they generally do; the anterior surface of the lungs appeared as if covered with white coloured flat tubercles, as if some white fluid had been effused under the covering pleura; on making some incisions into the substance of the lungs, the cells were found filled with a whitish purulent-looking mucus, with only a small admixture of air. The cells immediately under the investing pleura, thus filled, were the cause of the external appearance of the lungs above described. Some very small portions of the lungs appeared to have the cells less full of this mucus than the rest, the external surface of these portions having a more natural appearance.

The posterior surface of the lungs had a brighter appearance than the anterior, having more the look of recent inflammation.

The inside of the trachea and its ramifications was painted with red vessels, appearing to have been the seat of recent inflammation.

CASE IV.

*In which the substance of the lungs was inflamed, and the smaller ramifications of the bronchiæ were inflamed and dilated.**

On Monday, 26th March, 1828, I visited Sarah Allison, aged two years, residing in Blewitt's-buildings, Fetter-lane; she lay upon the left side; expiration difficult, irregular, and nearly the whole act taking place by the diaphragm alone; pulse very frequent; face puffy and livid; lips purple; nostrils dry; alæ of the nose in considerable action; tongue white; countenance anxious; skin of the body hot; great thirst; extremities cold; frequent paroxysms of cough, during which the child put its little fingers down its throat, to get rid of the phlegm; bowels open. She had been for three weeks affected with hooping-cough, and several children had died of the same disease in the neighbourhood.

On the 29th, difficulty of breathing increased; great restlessness; face livid; respiration very irregular and abdominal; flatulent distension of the abdomen. In the evening, the hands became clenched and turned inwards; face puffy; jaw locked; each side of the body in turns convulsed, and she died in a few hours.

* See Pathology of Hooping-cough, by Dr. Alderson, of Hull, in the Medico-Chirurgical Society's Transactions, vol. xvi. p. 82.

Dissection, 36 hours after death.

There were no adhesions of the pleura, nor any fluid in the cavity of the chest; the lungs did not collapse; they contained much air, which was with difficulty pressed out; in different parts of the lungs, but chiefly in the lower portions of all the lobes, a change of structure had taken place, which has been termed lobular hepatization; this was more evident in the middle lobe of the right lung, which was quite contracted to the size of the pancreas, and which it very much resembled in the sensation which it conveyed to the touch; the septa dividing the lobules were distinctly seen, and appeared perfectly healthy, the lobules themselves quite dense, and somewhat resembling the muscular structure of the heart; several of the smaller bronchial tubes were much dilated, and lined with thick mucus; there was no appearance of inflammation in the trachea, or in the large bronchial tubes.

CASE V.

*In which tubercles were found in both lungs, and an abscess in the right lung.**

Miss J. K., aged four and a half years, remarkably stout of her age, early in December was seized with the ordinary symptoms of catarrh. By the middle of the month the kinks were fully formed; they were exceedingly violent, of the bursting kind, but not accompanied with hooping. Her skin was hot and dry, her pulse 130. Her tongue was foul,

* See Dr. Watt's Treatise, p. 159.

and she complained of considerable thirst. The breathing was somewhat difficult, but not remarkably so. About the end of December, her breathing, which had never been easy, became more difficult, the cough became still more distressing, and she complained occasionally of a pain in her chest; for some time after this, the chief complaint she had was the violence of the cough. The kinks returned at short intervals, and the expirations were the most violent and rapid I have ever seen; during their continuance, the face was of a fiery red colour, and the eyes staring as if they would start from their sockets; the pulse became still quicker; the expectoration, which had been very deficient at first, became now abundant; in a little time, it became mixed with purulent matter; symptoms of hectic came on, and she began to fall off rapidly in her flesh and strength; she lived, with little variation in her symptoms, till about the middle of February, when her feet and hands began to swell, and she died on the 21st.

Dissection, (p. 165,) 25 *hours after death.*

The body appeared very much emaciated. On opening the thorax, the lower part of the right lung was found to adhere firmly and extensively to the pleura costalis of that side.

This portion of the lung seemed to be enlarged, and occupied fully that portion of the chest. It was of a whitish colour, had lost all appearance of cellular structure, and on being pressed with the finger it felt hard and gristly in some parts, and soft and pulpy in others.

In removing the adhesions, a large abscess was discovered, ramifying through this part of the lung in all directions,

and partly filled with purulent matter. The immediate parietes of the abscess were of a dense cheesy consistence, and varied from a quarter of an inch to an inch in thickness. Beyond this solid portion, the whole substance of the right lung was interspersed with tubercles, exactly similar to those met with in ordinary cases of pulmonary consumption. Many of these tubercles were smaller than peas, and some of them as large as hazel nuts. Some of them were slightly, others more extensively inflamed, and many of them were in a state of suppuration.

The whole surface of this lung was covered with a layer of inflammatory exhudation, and in many places the investing pleura was very much eroded and destroyed.

The left lung was much more collapsed than the right; it had the same tubercular feel, and was much more solid than natural.

Some parts had a peculiar reddish purple colour; which seemed to depend on the quantity of blood contained in them. When cut off, they sunk readily in water.

On cutting into this lung, the number of tubercles was nearly as great as in the right; but fewer of them had arrived at a state of suppuration. On this side there were no adhesions.

The pericardium contained a much larger quantity of fluid than usual, but the heart itself appeared to be sound. The internal surface of the trachea was also a little more vascular than usual, but could scarcely be said to be inflamed. Here and there we could perceive some particles of purulent matter, but these had evidently arisen from the abscess in the lungs.

The liver was found much enlarged, extending to the left hypochondrium, and downwards into the umbilical region.

Its surface was of a whitish ash or clay colour, resembling boiled liver. The structure did not appear to be much changed, but the whole substance felt somewhat denser than usual. The gall bladder was full of a thin light-coloured bile. The spleen was enlarged; the head was not examined.

CASE VI.

*In which the bronchiæ were found dilated.**

H. A. Lajoie, aged three and a half years, of a full habit, and fair-haired, was admitted into the Hôpital des Enfants on the 30th January, 1808; he had had hooping-cough three months; his cough used to return in paroxysms at intervals of several hours, and was followed by copious expectoration of liquid yellow and very offensive purulent matter, which at times was mixed with mucus; it had the smell of pus which comes from an abscess by congestion; it was not expectorated in the usual manner, but mouthfuls of this liquid continued to run from the mouth for many seconds. On the 3rd February, it was remarked that he was always lying on the left side, which on percussion emitted a dull sound; a blister was applied to it, but that afforded him no marked relief; on the 14th of February, therefore, a large issue was made in the arm, and from that day the child declined very rapidly. In the intervals of the cough he was free from pain; his sleep was sound; his face, which was round and rosy at the beginning of the disease, became, as well as his hands, a little puffed; to this symptom was

* See Laennec, Treatise on Auscultation, p. 216.

added looseness of the bowels; the skin became hot; the pulse small and more frequent; the thirst more intense: for two days the expectoration was diminishing; on the 15th it ceased altogether; the whole of that day the child was in a sinking state; in the evening he began to utter shrill cries; at eleven o'clock they ceased; and in a moment after he was dead.

Dissection, 36 *hours after death.*

A slight wasting had taken place, which was more apparent in the limbs than in the face; flesh soft, without any sensible infiltration; face pale; no remarkable alteration of the features; the blistered part was livid; there was no effusion into the serous cavities; the lungs collapsed very little; when the chest was opened, the left adhered slightly to the costal pleura, in its inferior half; its upper lobe was of a clear yellow colour, unattached, light, and crepitating, but the inferior lobe was heavy, hard, of a purplish colour, and livid on its exterior; when a deep longitudinal incision was made into it, upon a very slight pressure, at least an ounce and a half of a purulent and fetid liquid escaped, similar to that which the patient had expectorated, except that, instead of being yellow, it approached a little to a grey colour, a difference which might depend upon cadaveric alteration; this liquid was contained in a number of round smooth cavities, close to, and communicating frequently with each other; the largest of these would contain the tip of the finger; there were a greater number of others which might hold a large pea. Upon a minute examination, all these cavities were found to be prolonged in canals which terminated, by a longer or shorter course, and in different directions, in the bronchiæ, of which they were evidently the

continuation; with a bistoury and director, I opened eight or ten of these ramifications in their whole length, and I saw distinctly that each branch of the bronchiæ, after a course of about half an inch, dilated considerably, increasing in diameter as it separated from the trunk, and terminating at last in a large cul de sac, at the distance of a line or two from the surface of the lung; near their extremities, the greater part of them would admit the little finger, others would receive a common-sized quill. In their course they gave off some branches which terminated also in culs de sacs, after a course of two or more inches; all of them contained more or less of the purulent liquid which has been described: the mucous membrane was every where of a deep red and livid colour, which was not lessened when the layer of blood which was lying upon it was taken off; but this membrane was remarkably thinned, and, on the most careful examination, the smallest alteration could not be perceived in it, and it was evident that the pus which had been expectorated by the patient had been secreted by it; as far as about two inches from the first bronchial division the cartilaginous rings might be distinguished, but beyond that they seemed to degenerate into a dense cellular tissue, and to be confounded with the mucous membrane, which could scarcely be separated by dissection from the dense pulmonary tissue that surrounded it. The canals which I have just described formed at least three fourths of the volume of that portion of the lung; an incision into it could not be made without dividing a great number of them. The intermediate pulmonary tissue, reduced to a very small volume, was compact and of a grey colour, but flaccid and not hard like that which generally surrounds tubercles; it presented no trace of its organization or cellular structure.

The surface of the organ presented a layer, of one or two lines in thickness, of healthy pulmonary tissue, only gorged with blood; here and there in that portion of the lung were seen at least ten or twelve red lymphatic glands, varying in size from that of a pea to double or treble this volume; the greater part of them had the appearance of the lymphatic glands that are found in other parts of the body; some of them presented in their centre a soft grey substance like mucilage; they were all applied upon the bronchial ramifications, and penetrated with them into the middle of the lung; there were about as many more of them, but of a still larger size, at the root of the lung, round the division of the bronchiæ, the termination of the trachea, and amongst the vessels; some were of a blood colour, and of the usual size of the bronchial glands; two or three only were red, and of the size of a small nut; the divisions of the pulmonary artery and vein could not be followed, because they were not injected, but they were scarcely visible anywhere, except at the surface of the lung, which was probably the only part that served for the purposes of respiration, together with the superior lobe: this last, although sound and crepitating in its tissue, presented nevertheless two or three bronchial branches, dilated at their extremities, and terminating in culs de sacs; like those of the inferior lobe, these cavities did not contain pus; their mucous membrane was red, and coated with blood; the right lung presented nothing similar; it adhered a little to the pleura on its posterior and inferior surface, which was of a livid colour; the anterior and superior were light and yellow, but the whole of the inferior lobe was heavy, red, livid, sunk in water, and had no cellular appearance, except a little at its surface; it was much gorged with blood; the mucous membrane of the trachea was

of a livid red colour, especially inferiorly; the interior of the larynx was, on the contrary, very pale; the liver was very large, it occupied the whole of the epigastrium, ascending as high as the sixth rib, and descending on the right side to within two or three lines of the crest of the ilium; its tissue was yellow, and of a paste-like consistence, and covered with fat the blade of the scalpel; the gall bladder was moderately distended with ropy bile, of a dark-green colour, which stained its parietes; the mesentery contained no fat, and its glands were a little swelled, but unaltered; the rest of the viscera were healthy.

CASE VII.

In which tubercles were found in both lungs; inflammation of the bronchiæ and of the substance of the lungs, in a child who died under my care.

Ellen Johnston, aged three years and five months, a sandy-haired delicate-looking child, residing in Compton Street, had been very weak from her birth. About the 16th of September, 1837, she was attacked with measles, from which she had scarcely recovered when she was seized with a cough, which (about the 3rd of the month) manifested itself to be hooping-cough.

Her lips and cheeks were bluish; her face somewhat swollen; respirations forty in a minute; inspiration very short and quick; chest imperfectly dilated by taking a full breath; alæ of the nose in continual motion; pulse about 120; skin hot; great thirst; cough very frequent; hooping not loud; bowels open; never sleeps at night, and continually crying for drink.

The respiratory murmur was inaudible in some parts of the chest, and in others heard with loud mucous râles.

The child improved rapidly under the treatment adopted, and on the 23rd ceased to whoop. But on the 28th she was attacked with small-pox, under which she sunk exhausted on the 4th November.

Dissection on the 6th, 48 hours after death.

The lungs did not collapse when the chest was opened; there were no adhesions between the pleura, some emphysematous vesicles were observed in the margin of both lungs.

On making a deep longitudinal incision into each lung, a considerable quantity of bloody serum flowed out, but more from the right than from the left lung. Great numbers of small tubercular granulations nearly solidified the upper lobe of the right lung, and were thickly studded throughout its substance.

There were some also scattered through the left lung. The trachea was nearly filled with muco-purulent matter; its mucous membrane was very pale, excepting at its upper part, where a few small-pox pustules were scattered over it.

The inner surface of the bronchial tubes was of a red colour, and the matter contained in them was distinctly purulent.

The liver was large; the mesenteric glands were much enlarged, some of them to the size of a pea, others to that of a bean. The viscera were healthy; the head was not examined.

CASE VIII.

*Bronchitis — Hooping-cough ; pleuropneumonia on the left side ; partial pneumonia on the right— Bronchial ganglions tubercular —Enteritis— Brain healthy — Inflammation of the mucous membrane of the air passages— Dilatation of the extreme bronchial ramifications —Nervus vagus healthy— Left lung entirely hepatized—Inflammation of the ileum.**

Theresa Dennis, aged four and a half years, entered the hospital April 9th, 1826: hair light, eyelashes long, eyes blue, face pale, of full habit. In early infancy she was subject to eruptions on the head; afterwards glandular swellings appeared in the neck, which began to suppurate three years ago; health pretty good; not subject to cold, but nevertheless she has had a cough since the 24th of March last, which comes on in paroxysms, and especially during the night. The cough often brings on vomiting. The thirst is great. Five days have elapsed since she has had a stool.

10th.—Skin hot; pulse 116; tongue white and moist; great thirst; abdomen painful; no evacuation; cough in frequent paroxysms, ended by the characteristic inspiration; expectoration of yellow mucus, adhering to the vessel; mucous and sibilant râle on the left side of the thorax, with little pulmonary expansion, and slight resonance on percussion.

15th.—Breathing anxious; pulmonary expansion of the two inferior thirds of the right side of the chest nearly absent.

* Arch. Gén. de Méd., vol. 33, p. 239. Mém. de la Coqueluche, par M. Blache.

17th.—Pulse 160; paroxysms less frequent; drink refused.

19th.—Expectoration has almost ceased; respiration accelerated and short.

20th.—Pulse of countless frequency; extreme dyspnœa; died at three in the afternoon.

Post-mortem examination made on the 22nd.

Sensitive internal apparatus.—Veins of the surface of the brain injected; arachnoid membrane humid and healthy; substance of the brain of good consistence; a teaspoonful of serum, slightly turbid, was found in the lateral ventricles; middle and base of the brain natural; pneumo-gastric nerves healthy.

Respiratory apparatus.— Slight redness of the mucous membrane of the air passages, especially in the intervals of the cartilaginous rings; dilatation of the ramifications of the bronchiæ; an ordinary director penetrates easily to their very extremities; mucous membrane of a purplish red colour; ganglions of the bronchiæ large, especially on the right side; tubercular at their centres. The left side of the chest contains about six ounces of yellow serum with flakes. Some false membranes, soft and recent, found on the surface of the costal and pulmonary pleuræ.

The superior lobe of the left lung red and crepitating; but to the extent of two or three inches from its lower part it is red and hepatized, and sinks in water.

The whole of the inferior lobe presented a specimen of red hepatization. At its posterior part were observed four little points about the size of a nut, where the tissue was greyish and softened. The two superior lobes of the right lung were red and crepitating. The inferior lobe was red

and hepatized. At the posterior parts of this lobe, under the pleura, was perceived a greyish softened point, without any communication with the ramifications of the bronchiæ. No liquid in the pericardium; thickness of the left ventricle as compared to the right as three to one; fibrous coagula of blood were found in the right cavities.

Digestive apparatus. — Mesenteric ganglions healthy. The stomach contained a yellowish liquid; thick mucus adhered to its internal surface; its large extremity was traversed by veins full of blood.

The follicles of the pyloric portion very strongly marked. Thickness and consistence of the mucous membrane natural. On the interior of the duodenum were a great number of small black points. The contents of the two superior portions of the small intestine were liquid, and of a yellowish ocre colour. The inferior portion contained a little of this matter; the sub-mucous veins were much injected; towards its termination it was of a bright red colour; the injection was speckled; the patches of Peyer's glands were red and enlarged; the follicles isolated and strongly developed to within two inches of the ileo-cæcal valve; about twelve inches from this place, and for the extent of four inches the injection was very red; it became pale again near the valve. Beneath the mucous membrane of the appendix vermiformis were seen black, confluent, depressed spots, around which the interior coat was pale, and formed an elevated margin. The large intestine was distended; contents greenish; some red patches very apparent upon its mucous membrane, which was, for the most part, pale; its consistence and thickness were good.

CASE IX.

*Chronic pulmonary catarrh; Hooping-cough.—'Varioloïde,' double tubercular pneumonia.—Brain healthy—The mucous membrane of the air passages pale—The extreme ramifications of the bronchiæ dilated—Bronchial ganglions tubercular—A cavity at the base of the middle lobe of the right lung almost entirely hepatized—Pneumonia of the left side—A tubercle in the spleen—Small intestine reddish—Large intestine healthy.**

Clémence Deshays, aged seven years, entered the hospital on the 7th of April, 1826. Hair light; eyelashes very long; eyes blue; face pale, and shewing no marks either of small-pox or of cow-pox. During her infancy she had neither breaking-out, discharge behind the ears, swollen glands, nor ophthalmia.

In winter she was very liable to take cold. For upwards of two months she had had a cough, which during the last six weeks had exhibited itself in paroxysms. For the last month she suffered from an almost incessant pain at the right side of the thorax, and frequent headaches; great wasting of the body. Two days before her admission, nine leeches had been applied to the part in which the pain was felt. She died on the 25th, at one o'clock in the afternoon.

On the 8th of April, when she was visited, small pustules, rather hard at the base, were observed on different parts of her body, namely, on her shoulders, neck, legs, and stomach; some were dried up and shrivelled, while others were

* Archives gén. de Méd. vol. III. p. 235. Mémoire de la Coqueluche, par M. Blache.

replaced by a black and dry crust. The paroxysms of the cough were violent and frequent, and terminated by the usual characteristic inspiration. The expectoration was abundant, composed of sputa, white, green, yellowish, and thick, and adhered to the vessel. The pulmonary expansion was more feeble on the right side of the thorax than on the left, where the resonance was proportionably less; pulse 95; tongue white and foul at the base; bowels torpid—one natural stool.

18th of April.—Pulse 124; paroxysms frequent; expectoration puriform and streaked with blood; respirations sixty in a minute.

After this date her respirations became more frequent; skin cold; dyspnœa very great; voice faint; and on the 25th she died, at one P. M.

Post-mortem examination on the morning of the 26th of April.

Arachnoid membrane and substance of the brain perfectly sound. No appreciable alteration in the pneumo-gastric nerves.

Thorax.—The mucous membrane of the air passages pale; the ramifications of the bronchiæ dilated; an ordinary director might easily be introduced to their extremities; a female sound entered readily two of these last ramifications, which terminated in a large cavity that was found at the base of the middle lobe of the right lung; this cavity was capable of receiving a large egg, and contained about two spoonfuls of a greyish liquid, and some yellowish flakes. The parietes of the lower part and of the sides were formed of red and dense pulmonary tissue, about two lines in thickness. Neither false membranes, concretions, nor albuminous

granulations were found in its interior. The tissue of the lungs was very dense, and presented the appearance of the fundus of a bladder affected with chronic catarrh; in it were seen a sort of smooth fibres, which interlaced, and formed areolæ in some parts. The superior lobe presented some points of grey hepatization, of one or two inches in extent; in other parts it was crepitating. The inferior lobe was red, easily torn, and at its base had points hepatized and hard; it sank in water. At the top of the upper lobe on the left side some points of grey hepatization were found infiltrated with pus. The inferior lobe on the left side presented a mixture of red and grey hepatization, which was easily torn, and from which, when cut, pus flowed out. At the base of this lobe, to the extent of about an inch and a half, a dense white tissue was found, with some lines of grey pointed with red. There existed besides, a softened part, which might hold a filbert, containing a yellow purulent fluid, free from granulations. Three ounces of clear serum in each side of the chest. The bronchial ganglions were brown externally, and white, dense, and tubercular internally. On the anterior part of the right side were two tubercular ganglions of the size of a large nut, soft in their centres. A spoonful of serosity was found in the pericardium.

The heart was firm and red; some white fibrinous clots were found in the right cavities. The thickness of the left ventricle, as compared with the right, was as three to one.

The mesenteric glands were healthy. Some thin mucus was found in the interior of the stomach; its lesser curvature had a few red points in it; its mucous membrane generally was pale, of good consistence, and of the usual thickness.

The mucous membrane of the duodenum was pale, and the follicles were very numerous.

The mucous membrane of the small intestines was pale; its follicles were isolated and grey.

Some patches of Peyer's glands were red.

CASE X.

*Hooping-cough; diarrhœa; partial pneumonia; laryngitis—Tubercles in the lungs and bronchiæ—Hepatization on both sides.**

—— Grosset, aged five years; hair brown; eyelashes long; complexion fresh; had the small-pox when two years old; was not vaccinated; health generally good, but very liable to take cold; his brother had had the hooping-cough for six weeks, and he himself, after having a cough for a fortnight, was attacked with paroxysms like those of his brother, which were accompanied by the characteristic inspiration, and often succeeded by vomitings. He was admitted into the hospital on the 19th November, 1827. He had had a looseness of the bowels for four days.

On the 20th November, face a little animated; during the night some paroxysms of coughing terminated with the peculiar inspiration; breathing a little oppressed; mucous râle and a good deal of crepitation on both sides of the thorax anteriorly; pulse 76; skin cool; tongue clean and moist, reddish all over; bowels torpid; two or three yellowish liquid stools.

24th. — Cough dry; coming on in short but painful

* Archives gén. de Méd. Vol. III. p. 246. Mémoire de la Coqueluche, par M. Blache.

paroxysms; complained of suffering in the anterior part of the neck.

25th.—Pulse 76; irregular.

30th.—Cough short and dry; the paroxysms scarcely evident; mucous râle on the left side anteriorly; sub-crepitating on the right side posteriorly; a purulent discharge from the left ear; pain in the throat.

December 2nd.—Pulse 124.

December 3rd.—Respiration short and frequent; great increase of anxiety; chilliness; paleness; pulse imperceptible. Died at half-past eight o'clock, A. M.

Post-mortem examination, made on the 4th of December, at half-past nine in the morning, twenty-two hours after death.

Head.—Purplish serum infiltrated in the sub-arachnoid tissue; superficial vessels not injected; nothing irregular at the base; spinal marrow not examined; mucous membrane of the larynx red, especially in the ventricles.

Trachea and bronchiæ healthy; ganglions of the bronchiæ brownish, and in front of the right bronchus changed into a tubercular substance.

Thorax.—The upper part of the right lung free from adhesions, and for the extent of an inch in every direction the tissue gorged, and shewing six small miliary tubercles. The anterior portion of middle lobe greyish and flabby; sank in water; not easily torn; when pressed, a reddish matter exuded, which was like pus, but not fetid; inferior lobe gorged; the extreme divisions of the bronchiæ of a purplish red; adhesion of the top of the superior lobe on the left side to the costal pleura, for the extent of two inches and a half; tissue hard and brownish. In the middle of

this lobe was found a cavity, large enough to contain a nut, and filled with soft tubercular matter: this cavity communicated with the bronchiæ. Inferior lobe much gorged. Lower divisions of the bronchiæ red and brown. Aorta reddish internally. Heart softish, and of the ordinary volume; cavities unobstructed.

Abdomen.—Mesenteric glands pale, and but little developed. Mucous membrane of the stomach coated with thick mucus; rugæ very deep; colour pale; consistence and thickness ordinary. Mucous membrane of the small intestine generally white. Some of Brunner's follicles inflated towards the end of the ileum. In the large intestine there were solid substances; mucous membrane pale; follicles moderately projecting.

Liver of a pale grey; bile brown. The other organs healthy.

CASE XI.

*In which lobular hepatization had taken place in both lungs, with congestion of the brain.**

John Allison, aged seven and a half months, brother of Sarah Allison, a remarkably strong and vigorous child, had been affected for a fortnight with hooping-cough; but as he took the breast freely, and was very lively, little had been thought of his complaints. I found him, on the 11th of April, 1828, breathing with great difficulty; respirations 62 in a minute, irregular and abdominal; nostrils dry;

* *See* Dr. Alderson on the Pathology of Hooping-cough, Medico-Chirurgical Society's Transactions, vol. xvi. p. 83.

alæ of the nose in great action; pulse 140; tongue white and furred.

On the 13th he had several convulsion fits, and the abdomen became distended with flatus. The evacuations, like chopped grass, and offensive, passed during the paroxysms of cough. Skin of the upper parts of the body intensely hot; extremities cold; face flushed; lips purplish; breathing more laborious,—catching and abdominal. Died in the afternoon.

Dissection, 40 hours after death.

The head was rather large; the forehead remarkably protuberant; the calvarium was not raised with greater difficulty than usually attends the operation in the infant. The quantity of serum in the ventricles and under the arachnoid coat was rather more than was natural.

The substance of the brain was of the soft consistence natural to the organ at the age of the subject. The only morbid appearance observable, except the before-mentioned slight effusion, was an irregular venous marbling of the medullary matter. There was no trace of pleuritic inflammation on either side of the chest.

About one-fourth of both lungs, towards their posterior and inferior part, was the subject of a morbid change; the structure was rendered very firm and dense; its limits were perfectly defined; the septa between the lobules constituting the boundaries. The portions in which this change had taken place were of a dull red colour, perfectly void of air, sinking instantly when put into water, and undergoing no change when thin slices were subjected to ablution in it. The individual lobules were firmer than they are often found in hepatized lungs; and the cellular membrane between them

retaining its natural structure, produced a combination of looseness and density, which has not been inaptly compared to that met with in the pancreas. The remaining portions of the lungs were of a light colour, of an uniform texture, spongy and crepitant; but very little, if any, of the air pervading the cells could be expelled by the bronchial tubes.

Most of the tubes were filled with a light yellow secretion, which, in the greater number, had assumed a concrete form having very much the character of fibrine; in others it resembled thick puriform mucus: when it occurred in the concrete form, it adhered, though slightly, to the lining membrane of the tubes. This membrane was generally pale beneath the false membrane, but in some places it was a little reddened; most of the divisions of the tubes were somewhat dilated; the concrete secretion which filled them readily explained the difficulty of expelling air from the lungs.

The heart was healthy; the blood in the right ventricle had formed a coagulum free from red particles. The abdominal viscera were generally healthy, and offered nothing remarkable, except that the right lobe of the liver had a deep cleft, producing an extra lobule.

CHAPTER IV.

EXPLANATION OF THE SYMPTOMS OF HOOPING-COUGH.

Cough, peculiar—How produced—Why worse after meals, exercise, excitement, &c.—Whoop, how produced—When suspended—Cause of its absence or presence explained—Causes of expectoration, rapidity of pulse, feeble respiration, absence of pulmonary expansion, frequency of respiration, absence of resonance on percussion, lividity of the countenance, difficulty of breathing—Extreme debility in the advanced stage explained—Cause of convulsions, and symptoms which precede them.

HAVING now before us examples in detail of all the morbid changes which have been discovered in persons who died of hooping-cough, and a report of the symptoms observed in each particular case, we may, by comparing the one with the other, explain the cause of the disturbance of so many functions, and discriminate between the symptoms produced by the disease and those which were caused by the changes of structure in some organ or organs that had taken place in its progress.

No account is given in these reports of the examination of any child who died of simple hooping-cough, because the disease in this form very rarely, if ever, destroys life. Acci-

dent alone, therefore, could be expected to furnish an opportunity of observing any morbid lesions which might be supposed to exist in such cases; and I have not met with such an opportunity in the course of my practice. The use of the stethoscope is the only means we have of ascertaining the physical condition of the parts affected; and all that we learn from this is, that in the interval of the paroxysm the respiratory murmur is heard sometimes accompanied by slight mucous râles. The cause of the cough, and other symptoms, must therefore be referred to functional disturbance, rather than to organic changes of structure.

The cough is so peculiar shortly after the commencement of the disease, that it may easily be distinguished from that of an ordinary cold; its strong expirations are made with a degree of force and loudness which the mere action of the muscles of respiration can scarcely effect; and the lungs seem to be emptied of air more completely than could be done by their means alone.

Any one who will make the experiment will perceive, that by the exercise of the voluntary muscles of respiration he cannot either continue coughing loudly for so long a time, or empty the lungs so completely of air, as a person does in a paroxysm of hooping-cough; it must therefore be inferred that the involuntary muscles—namely, those pointed out by Reisseissen as connecting the extremities of the cartilaginous rings of the trachea and bronchiæ—powerfully assist in accomplishing both these objects. They seem by acting spasmodically to expel the air from the lungs, and to excite by sympathy the voluntary muscles of respiration; —the combined action of both sets of muscles appears to produce this peculiar cough.

The reason why the cough is always worse after taking

solid food, or eating a hearty meal, is, that the stomach being unable to digest its contents, they are permitted to fall into a state of fermentation, whereby gas is generated, which distends the stomach and presses it upwards against the diaphragm; thus confining the lungs, and preventing them from expanding: this, as a matter of course, produces cough and difficulty of breathing. This latter symptom is so frequently the effect of flatulence in persons whose lungs are at all affected, that in every such case we ought to examine whether that cause be present, before we decide upon the means to be adopted for the relief of this symptom.

I have frequently found, when extreme difficulty of breathing, with cough, was complained of, that the stomach was so much distended as to project beyond the margin of the ribs, and give a clear tympanitic sound on percussion, occasioning such an oppression of the lungs as gave rise to all the suffering.

The reason of the increase of the cough upon taking exercise, laughing, or other violent excitement of any kind, is, that more blood is thrown into the lungs than is usual, which produces irritation, and consequently cough. Exposure to cold air renders the cough worse, because, not only is the mucous membrane of the lungs irritated by the inhalation of air so much below the temperature of the body, but the skin being chilled, the blood is driven from it into the vessels of the mucous membrane; hence, when a person is very cold, the face seems thinner, and appears to contain less blood than when under the influence of a warm atmosphere;—circumstances which deserve attention in the treatment of coughs.

The whoop takes place in the larynx and trachea, and appears to be caused by a rush of air through a contracted passage, for no sudden or violent inspiration could

produce this sound in the natural healthy state of the air tubes. The lungs are so completely emptied of air by long-continued expirations, that a most distressing sense of suffocation is produced; to relieve which, a full inspiration is instinctively made, and at the same moment the rima glottidis is contracted, and the air passing quickly through a very narrow opening causes the whoop. The contraction evidently subsides after the paroxysm is over, as the whoop is never heard during the interval. It could not thus intermit if it arose from inflammation of any part of the air tubes, or from any other permanent cause; consequently it must be the effect of some temporary irritation, which being removed, a full inspiration no longer produces any peculiar sound.

The whoop is suspended by the following circumstances, —viz., the lungs becoming very much diseased; the occurrence of convulsions; or the accession of some other disorder. In the first case, the capacity of the lungs is so much diminished by their solidification, that the air cannot enter with sufficient force to produce a whoop; in the second, the whole disease is interrupted, and therefore the whoop ceases; and in the last, the cause of its suspension must arise from the functions of the nerves which supply the lungs being impeded by the state of the brain, as the lungs themselves are often very little affected.

Dr. Watt, p. 134, gives a satisfactory explanation of the cause of the presence or absence of whoop, which I shall quote in his own words. "In one set of patients, the difficulty seems to be at the top of the windpipe; but in these cases the diaphragm and the muscles of the abdomen and thorax are not in very violent action: in the other set of patients, the diaphragm and muscles concerned in the process of respiration act most convulsively, but the patient

has not the sense, or the appearance, of constriction about the throat. In the one case, the cells of the lungs seem to be incapable of taking in a sufficient quantity of air, or the air, when it is taken in, does not seem to serve the purposes of respiration; in the other, the capacity of the lungs is entire, a vacuum can be speedily produced, but, from some constriction or difficulty in the passage, the air enters slowly and with a wheezing or stridulous noise. In the first case, it may be said that the patient is threatened with symptoms of suffocation; in the last, with symptoms of strangulation."

Expectoration is rendered necessary by a morbid increase of the natural secretion of the mucous membrane of the air tubes. In the first stage of the inflammation of this membrane, no secretion takes place; the cough is therefore dry: in the second stage, a watery sort of secretion comes on, which gradually becomes thicker and more tenacious, and finally purulent. So long as the muscular fibres of the tubes act vigorously there is no difficulty in getting rid of the matter as fast as it is secreted; but when the tubes become dilated, their muscles act feebly, and the most violent efforts of the voluntary muscles of respiration fail to expel it. This is remarkably the case when bronchitis is superadded to the simple disease.

The rapidity of the pulse during the paroxysm is the natural effect of the increased velocity with which the blood is propelled by the violent action of the muscles during the continuance of the cough. The swollen appearance of the face is caused by the unusual quantity of blood driven up to the head, and prevented from returning into the right side of the heart by the long-continued expirations.

The intermission of the paroxysms does not admit of an easy explanation. No reason can be assigned why the cough when it once commences should not continue for an indefinite period. It is said that the coughing is prolonged for the purpose of expelling the mucus which accumulates in the air tubes, and that it ceases when that is accomplished. But this cannot be the cause; because, at the commencement of the disease when no mucus is secreted the cough comes on in paroxysms, and the intermissions are as complete as in the later stages of the disease when the secretion of mucus is very abundant. The intermissions of the cough would excite our surprise more than they do, but that we are accustomed to their recurrence in agues, and some other diseases, without any assignable cause.

The feeble respiration and mucous râles which are heard in parts of the chest during the intervals of the paroxysms, in even the milder forms of the disease, indicate that some of the cells of the lungs are blocked up, and that the air, as it enters, becomes entangled in the mucus adherent to the sides of the air tubes; the slight dilatation of the chest, and the absence of the natural respiratory murmur, in the more severe forms of the disease, indicate a blocking up of the air passages; the colour and great distress of the countenance shew that the blood is not undergoing that change which is essential to the condition of health; and as by ordinary respiration a sufficient quantity of air cannot be introduced into the lungs, the respirations are performed with great rapidity,—fifty or sixty in a minute instead of the usual number, twenty,—in order by frequency to supply what is deficient in the quantity generally taken in at each healthy inspiration:—this group of symptoms decidedly indicates the presence of inflammation of the bronchial tubes.

If the disease proceed unchecked by remedies, the chest sounds dull on percussion, and when the ear is applied to it, either feeble respiratory murmur, or short and loud respiratory sounds, mixed with large crepitations, are perceived: these symptoms warn us that the inflammation is communicated to the substance of the lungs, that effusion into the parenchymatous structure has taken place, and that the cells are obliterated, partly by the pressure of effused fluid on their sides, and partly by being filled with mucus. Difficulty of breathing and a sense of suffocation are the natural consequences of this state; and the violent efforts of the respiratory muscles and the dilatation of the alæ of the nose are attempts to take in more air in order to relieve these distressing feelings.

The lividity of the countenance, blueness of the lips, and drowsiness, are caused by the circulation of venous or unchanged blood, owing to the respiratory organs being rendered incapable of taking in a sufficient quantity of air to decarbonize it. The difficulty of breathing is attributable to the same mechanical obstacle to the admission of air; and panting, which is an aggravation of the symptom, is produced by rapid exertion, because the quantity of blood sent into the lungs, and requiring to be purified, is greatly increased by it.

The cause of the extreme debility which occurs in the advanced stage of the disease is well accounted for by Dr. Badham, in the following manner, in his very graphic description of Acute Bronchitis:—"With respect to the sudden recurrence of the extreme debility in the more acute bronchial affections, which extinguishes all hope of saving the patient, it may probably be in some measure explained by reflecting, that those changes which are wrought upon

the blood in its transmission through the lungs by the agency of the air in respiration, must be very much impeded when the secretion is great. The mucus forms a varnish which tends to diminish the communication between the blood vessels and the air vessels; the blood, deprived of its pabulum, no longer stimulates the heart to a just degree of action; the circulation therefore becomes languid, and the pulse sinks. This view of the subject," continues he, "seems to require that the countenance should exhibit a livid rather than a pallid appearance. The livid hue would probably be more frequently evident, were it not for the languid state of the circulation; for the blood must be, under such circumstances, less oxygenized, and therefore less florid; but if the action of the heart and arteries be at the same time very feeble, it may not be propelled to the surface in sufficient quantity to cause a corresponding appearance in the complexion."

When convulsions take place, they are caused either by the increased force with which the blood is thrown into the head, or by inflammation of the arachnoid membrane; for it is to be observed, that after death there are often no marks of inflammation, the veins only are found congested with blood. Sometimes the fits come on suddenly; but an observing person would perceive that the child had been dull, and that the expression of the eye had been heavy some time before the attack; and frequently the convulsions and preceded by pain in the head, intolerance of light, are drawing of the thumbs across the hands. These are symptoms to which instant attention ought to be paid, as indicating irritation, or inflammation, of the brain.

CHAPTER V.

CAUSE AND SEAT OF HOOPING-COUGH.

Causes of disease attempted to be explained by organic changes of structure only—Inferences from post-mortem appearances as to the cause of disease not always just—Opinions of various writers as to the cause of hooping-cough, considered—Real cause not discoverable—Primary effects only to be ascertained—Spasm of the muscles of the larynx and bronchiæ—First effect of hooping-cough—Author's view coincided in by M. Blache.

Until the researches of the justly celebrated Hunter directed the attention of medical men to the alterations of structure which disease produces in the human frame, divers, and often unfounded, hypotheses were advanced, for the purpose of explaining the symptoms manifested in various disorders; and some unknown cause was believed to exist, to which were attributed both the symptoms observed and the morbid alterations of structure produced.

From Hunter's time to the present, medical men have rushed into the opposite extreme, and have sought to explain, not only all the symptoms which present themselves in every disease by the alteration of structure which a post-

mortem examination has proved to have existed during life, but also to shew that these morbid alterations really constituted the disease itself. It is manifest, however, that this method of reasoning is inconclusive; for the cause of the disease, whatever that cause be, may not only produce the symptoms, but may also induce certain alterations of structure; and then the altered condition of any organ, or organs, will give rise to a new set of symptoms, necessarily resulting from a morbid state of these parts.

In accordance with the modern method of medical reasoning, most writers on this disease consider the cause of hooping-cough to be an inflamed condition of the lungs, or bronchiæ, because these are the organs found most frequently affected in those who die of this complaint. There are others, however, who attribute the disease to an affection of the brain and nervous system; and some few who maintain that it arises partly from inflammation and partly from spasm. Under these three different heads may be classed the views entertained by the best authors as to the cause of this complaint; we proceed therefore briefly to consider the merits of each.

The late highly talented Mr. Alcock, from whom I received much practical instruction, states, in a paper published first in the Medical Intelligencer, and subsequently in his Lectures on Surgery, p. 132, that he had repeatedly ascertained by dissections of patients who had died of hooping-cough, that *the larynx invariably exhibited signs of inflammation* often to so great an extent as to close mechanically the glottis;—the mucous membranes of the trachea and bronchiæ were very vascular,—and the cavities of the latter were filled with fluid, more or less mixed with air. From these facts he infers, that the cough is a mere natural

effort to expel the offending matter when it has accumulated to such a degree as to impede respiration, and that its violence is in direct ratio with the tenacity of the phlegm. He considers his opinion confirmed by the fact, that on the removal, by spontaneous vomiting, of the secretion that adheres about the top of the larynx, the paroxysm terminates, and that it does not return until an accumulation of mucus again takes place.

Dr. Watt, in several parts of his treatise, maintains that hooping-cough is an inflammation of the bronchiæ, and asks this question—"May there not be some eruptive disease of the mucous membrane of the air passages, so minute as to escape observation, but so considerable as to excite that *inflammation* which is apparently the *principal part of the disease?*"

In addition to these, Messrs. Marcus, Broussais, Boisseau, Guersent, Rostan, and Dugès, all consider the cause of hooping-cough to be an inflamed state, or a specific inflammation, of the mucous membrane of the bronchiæ.

In proof of his opinion that the hooping-cough is produced by inflammation, Dr. Watt furnishes an anecdote, which, to my mind, leads to an opposite conclusion. It is as follows (p. 98):—"Two children had differed about their play. The one who supposed himself ill-used, to be revenged on the other, took a handful of saw-dust, and endeavoured to thrust it into his mouth. He succeeded in his attempt. The other one, crying and struggling for relief, allowed a quantity of the dust to be drawn into the windpipe. This gave him great uneasiness, and, after a short time, excited violent convulsive fits of coughing, which exactly resembled those of the chin-cough. Even the *whoop* was very distinctly formed. At first, he spit up nothing;

afterwards, a thick mucus; at last, the irritating cause being removed by the expectoration, the other symptoms disappeared. This was a very striking example of chin-cough brought on artificially."

This anecdote proves that the peculiar cough attendant upon hooping-cough, and the whoop also, may be produced by a temporary cause, and favours the notion that both are the result of spasm. For the introduction of saw-dust into the air passages of the child in question could not, in so short a time, have excited a degree of inflammation sufficient to account for those phenomena; but it might produce spasmodic contraction of the muscles of the glottis, and excite strong expiratory efforts for the purpose of expelling it; and then the sudden inhalation of air through the contracted passages would cause the whoop. This effect is analogous to the violent coughing produced by what is called "a drop going the wrong way," which is a small quantity of fluid passing the epiglottis instead of going down the œsophagus, and exciting a violent cough to expel it.

Now, supposing, for the sake of argument, that inflammation of the bronchiæ, or lungs, were the cause of death in every case of hooping-cough that terminates fatally; this circumstance would by no means warrant the conclusion that it was the cause of the complaint: for not only is the pulmonary affection incapable of producing the symptoms, but it may unquestionably take its rise from the long continuance and severity of the cough. If, as Mr. Alcock thinks, the cough were brought on by the accumulation of mucus in the bronchiæ, and were violent in proportion to the tenacity of the phlegm, the paroxysm ought to be longer and more violent in the later period of the disease, when the matter is thicker and more tenacious

than at its commencement; but the opposite is the case. Again, in laryngitis, when the quantity of mucus in the larynx and bronchiæ greatly impedes respiration, and occasions cough, why are not these circumstances accompanied by the whoop, if they be sufficient to produce it?

But the supposed foundation of the argument entirely fails: inflammation is not the cause of death in every instance; on the contrary, life is destroyed, in cases of hooping-cough, by the disease of other organs,—as, for example, the brain,—whilst the lungs remain perfectly healthy. We may, therefore, reasonably conclude, that the position assumed by these authors is untenable, and that inflammation of the lungs is not the cause of hooping-cough.

We proceed then, to inquire into another of the opinions which have been referred to—namely, that the disease is attributable to congestion, or inflammation, of the brain.

In an article on hooping-cough, drawn up by Dr. Webster, and published in vol. 48. of the London Medical and Physical Journal, after alluding to the pulmonary symptoms as naturally leading to the conclusion that the disease exists principally, if not wholly, in the organs of respiration, he expresses his opinion that the actual seat of the complaint may be in the head, and that the affection of the respiratory organs is only a secondary effect, or an effort of nature to relieve herself, by expanding the lungs to an unusual degree, in order to allow a greater quantity of blood to flow into them, and thus diminish the fulness and congestion of the brain. He says, that the pectoral are not the only symptoms present, but that they are *preceded or accompanied* by pain of the head, and fulness and redness about the temples and eyes; and notices particularly the relief which

epistaxis affords, and the fact that hydrocephalus sometimes occurs as a sequela to the complaint. He further appeals to the result of some post-mortem examinations he had made of children who had died of hooping-cough, in which he found, generally speaking, no marks of disease in the lungs, but sure indications of inflammation, or congestion, having existed in the brain; and in one case, more water than usual in the ventricles.

He considers his view of the pathology of hooping-cough confirmed by the marked, and almost immediate, success that followed the application of leeches to the forehead and behind the ears in one hundred and eleven cases of the disease. M. Alphonse Leroy, in 1803, expressed an opinion similar to that adopted by Dr. Webster. He considers that hooping-cough should be classed amongst the diseases of the membranes of the brain, by reason that its characteristics are essentially nervous; that it is epidemic; very often intermittent; and that it comes on at stated periods.

Dr. Webster and M. Leroy, and those who think with them, are fully as much justified in attributing hooping-cough to an affection of the brain, as Mr. Alcock, Dr. Watt, and others are in supposing it to be produced by inflammation of the lungs, or air passages. Both parties ground their opinions upon the coincidence of affections of the head, or lungs, with the cough; and all seem to maintain, that morbid lesions of the brain, or lungs, are found in those who die of hooping-cough. But the conclusion at which Dr. Webster and M. Leroy arrive is liable to a similar objection to that which has already been stated with regard to the opinion that pulmonary inflammation is the cause of the disease.

The cases may be numerous in which symptoms of distur-

bance of the brain precede, or accompany, hooping-cough; but the instances are much more numerous in which the disease occurs in all its violence without the presence of any symptom of the kind. Admitting, however, that these affections of the head did exist in every case, it is clear that, generally, they do not precede, but are the *consequence* of, the complaint; and accordingly cannot, under any circumstance, be alleged to be its cause.

But it is useless to pursue the subject any further; for the organic lesions which have been observed in those who died of hooping-cough are so numerous and so various that it is impossible that any one of them should be the cause of the disease. Those most frequently met with when death has taken place in an advanced stage of the disease are, inflammation of the pulmonary tissue, and dilatation of the bronchiæ. At the Hôpital des Enfans, phthisis is often found complicated with hooping-cough; pleurisy, pericarditis, œdema, and emphysema of the lungs are rare; alterations are seldom found in the stomach or intestines; an injected state of the arachnoid membrane and brain, and, less frequently, inflammation of the same parts, are amongst the lesions found in children who die of hooping-cough.

Inflammation of the pneumo-gastric nerves is another of the organic affections which has been supposed to give rise to hooping-cough. It has been observed twice by M. Breschet and M. Autenrieth, and fifteen times by Dr. Herman Kilian, according to the authority of J. Frank; but notwithstanding the most minute dissection it has never been met with by Messrs. Jadelot, Guersent, Baron, or Billard. Dr. Albers, of Bonn, opened the bodies of forty-seven persons who died of hooping-cough; in all these cases the two nervi vagi were examined from their

origin to the diaphragm; in forty-three cases they were found without alteration of volume, colour, or consistence; in the other four patients, who were scrofulous and lymphatic, the nervus vagus of the left side was once found reddish, and that on the right side three times; but in these cases it was found on the side on which the body had been laid. Whilst this statement shews that hooping-cough may occur without any affection of the pneumo-gastric nerves, it is but fair to insert here the report of a case communicated by M. Gendrin to the Society of Medicine in Paris:—"A young man had an enormous abscess in the parotid region, which was opened by an incision, and the pus evacuated. The parietes of this large bag, at the bottom of which the external carotid was perceived exposed, became slightly inflamed; and immediately after the patient was seized with a sonorous cough, coming on in paroxysms, and accompanied by nausea—in a word, exactly resembling hooping-cough." M. Blaud, of Beaucaire, thinks that this disease is the result of a specific solution saturated with hydrochlorate of soda, the irritation of which produces the kink. But in order to maintain this position, the presence of this salt in the matter expectorated must be proved, which has not been done.

With such a list of organic affections resulting from, or accompanying, hooping-cough, any inference as to the cause of this complaint drawn from the appearances observed in the dissection of those who have died of it, may be fairly set aside in the words of M. Roche,—"The diversity of lesions which takes place in the same disease, affords the strongest reason that not any one of them is its real cause."

Another view which is entertained respecting the nature

of hooping-cough is, that it is at first inflammatory and afterwards spasmodic.

Desruelles, in his Treatise on Hooping-cough, published in 1827, says, that "hooping-cough is nothing more than bronchitis complicated with irritation of the brain; and that the inflammation of the bronchiæ is always primitive, the irritation of the brain consecutive. So long as the bronchitis is simple," he writes, p. 77, "the cough is without any peculiarity; but when the diaphragm, muscles of expiration and of the glottis, larynx, and posterior membrane of the bronchiæ, and the air cells of the lungs, come into action, and are simultaneously affected with spasm, under the influence of the cerebral irritation, the cough changes its character, and becomes convulsive, and every time that an afflux of blood takes place into the brain, the cough returns and appears in paroxysms. This intermittent congestion precedes the kink of coughing, and disappears along with it, to reappear shortly, and to bring on a fresh paroxysm." The grounds upon which this opinion is founded are, that as it commences as an ordinary catarrh, and for some time cannot be distinguished from it, it must be inflammatory; and that as no whoop occurs in its first stage, it cannot be spasmodic;—that when the complaint is fully established, that is to say, in its second stage, it becomes so, and then the hooping sound takes place. To this reasoning it may be objected, that at the commencement of the disease the inflammatory symptoms are not more marked than the spasmodic. If we admit, for the sake of argument, that the mucous membrane of the trachea or bronchiæ is then slightly inflamed, it must, on the other hand, be granted, that symptoms of a slight spasmodic affection are also present before the whoop is heard; for though there be not spasm suffi-

ciently strong to produce a whoop, yet nothing but spasm could occasion the great number of expiratory efforts in succession which forms the first characteristic feature of the disease, and is such a peculiarity in the cough as renders it easily distinguishable from every other kind. Again, in the later stages of the complaint, the inflammatory symptoms are evidently aggravated, as well as the spasmodic. It follows, then, even granting that irritation of the brain has taken place, that hooping-cough cannot be said to be attributable at first to inflammation only, and afterwards solely to spasm. The great objection, however, to the adoption of this theory is, that it would lead to the use of remedies which, though calculated to subdue the inflammation, would have little or no effect in cutting short the disease.

Laënnec, who is quoted by Dr. Johnstone as authority for the opinion that the cause of this complaint is an inflammation of the mucous membrane of the bronchiæ, seems to me to attribute its symptoms to the agency of spasm. In p. 188 he writes thus:—The absence of respiration during the kinks "may be owing either to a momentary congestion, causing such a thickening of the mucous membrane as is sufficient to obstruct these canals," (meaning the bronchial tubes,) "or by a *spasmodic affection of the bronchiæ*. The discovery made by Reisseissen of a circular muscular apparatus in the branches of a diameter inferior to that of the bronchiæ, where the cartilaginous rings cease to be visible, will satisfactorily account for the *spasm* admitted by many practitioners upon no other proof than the symptoms attendant upon the different diseases of the lungs."

He regards as certain "the possibility of the closing of the small bronchial branches by a spasmodic contraction of the parietes;" and remarks, that the "spasmodic character

of hooping-cough is very evident in the phenomena which sometimes take place in the glottis, larynx, and even in the velum palati.

M. Albers, of Brême, in like manner, thinks hooping-cough a disease of the nerves, not necessarily connected with inflammation. M. Pinel also gives it a place amongst the pulmonary neuroses.

It is certainly a vain attempt to endeavour to ascertain the cause of hooping-cough from any morbid lesions of structure which are discovered after death; for even though the same organ were invariably to be found in a morbid condition, and affected in the same way, still the inference that the disease of that organ was the cause of hooping-cough would be open always to the same objection—namely, that it might have been its consequence only, and not its cause. But as several organs are found variously affected in those who die of hooping-cough, it cannot be argued that disease of any one or more of them is the cause of the cough, unless it be assumed that the affection of any and every one of those parts will produce it; and this would be assigning several causes for one and the same disease. Whatever light, therefore, a post-mortem examination may throw upon the cause of death, it affords no ground for any positive conclusion as to the cause of the disease.

From the review which has been taken of the various opinions which have been quoted, it sufficiently appears, that to designate any particular complaint as the cause of hooping-cough, because it is observed frequently to precede or accompany its commencement, is a mode of reasoning which is inadmissible. As one necessary preliminary to such a conclusion it must be shewn, that the complaint asserted to be the cause, is the sole cause, and that it is always this

complaint, and no other, which occasions the cough; for so long as in one case the cough is immediately preceded by disease of the head, in another, by that of the lungs, each apart from the other, neither of them can be acknowledged to be the cause.

Admitting it to be determined that the same complaint, or morbid condition, be it what it may, always precedes hooping-cough, the conclusion that it is the cause of the cough cannot still be maintained, unless whenever that condition takes place hooping-cough occurs. But what is the fact? Do we say that it is inflammation of the lungs? It is undeniable that every kind of pulmonary affection may exist, without ever giving rise to symptoms of hooping-cough. Or do we, on the other hand, decide that it is inflammation of the brain? It is equally unquestionable that no form of that disease with which we are acquainted is followed by hooping-cough whenever it occurs. The converse of these positions is also true; the cough may exist, as will be presently shewn, without any marks of inflammation in either the lungs or the brain. Again, inflammation of these organs may take place several times during life, whereas, hooping-cough occurs but once. We should therefore be driven to this conclusion, that the inflammation which we fix upon as the cause of the disease must be of a specific kind, and such as does not happen to a man more than once in his life; and this is really begging the question.

But it is evident that experience does not bear out the admission that the cough is always preceded by the same complaint, or morbid condition; for (as we have seen) one author maintains that it is preceded by an affection of the brain, the lungs remaining sound; another, by disease of the lungs, unconnected with any disorder of the brain;

and we must give credit to both parties for having ascertained the existence of the facts upon which they found their respective theories.

We have now shortly canvassed, as was proposed, the merits of the various opinions which the leading authors have adopted on the point in question; but the view which has been taken of them generally will be materially corroborated by observing further, that those very morbid conditions which are separately relied upon by these authors as preceding and producing hooping-cough, are, each and all of them, in many instances entirely wanting. It is hardly needful to adduce proof in support of this remark with regard to the affection of the head, for it has not been asserted by any author, so far as I know, that it is met with in every case. Dr. Watt, in several of his dissections, did not examine the head, because "*from the nature of the symptoms there was little reason to expect any morbid appearances in that quarter.*" Dr. Webster only says, "this affection of the head occurs more frequently than is generally supposed;" and, indeed, the experience of every practitioner of medicine must bear out the statement I have before made, that, though the cases may be numerous in which hooping-cough is attended with disturbance of the brain, the instances are much more numerous in which the disease occurs without the presence of any symptom of the kind.

Most authors, however, do assert that some bronchial affection is present in every case of this complaint. We shall therefore endeavour to shake this latter position by citing the testimony of other writers (the authenticity of whose statements we have no reason to doubt) in support of a directly contrary opinion. Mons. Blache, the writer before referred to, in the Dic. de Médecine, ou Répertoire

général des Sciences Méd. Article "Coqueluche" p. 24, says, that hooping-cough may, in certain cases, manifest itself *without being preceded by catarrh;* and gives the following case:— In the course of last June, the youngest child of his colleague, Dr. Tavernier, aged two years, was brought home from the country *in a state of perfect health, and without the slightest cold.* The day after her arrival she was playing for about half an hour with the daughters of M. Guibourt, *pharmacien,* who were both labouring under an attack of hooping-cough. In the evening of the second day after, she had an attack of spasmodic, shrill-sounding cough, without vomiting. It proved to be hooping-cough; and it continued well marked from that moment for two months *without any complication.*

In speaking of the physical signs of this disease, he says, "If hooping-cough be not complicated with bronchitis, auscultation cannot discover any kind of râle in the chest, as I have proved in twenty instances." And again—"Among the lesions observed after death, inflammation of the mucous membrane which invests the lower extremity of the trachea and the bronchiæ has been so often observed, that it has been considered as invariable; and it has without hesitation been asserted, that the hooping-cough is the result of this inflammation; but we must declare that this inflammation of the mucous air vessels *does not always exist,* and that we have several times in vain sought for any trace of it in the body, after having attempted without success to discover the symptoms of it during life."

Thus we have satisfactory evidence, both from a consideration of the physical signs, and from post-mortem examination, that the bronchial membrane is sometimes not at all affected during the course of hooping-cough—a con-

firmation, if any were required, of the conclusion which we had already come to, that bronchitis is not the cause of the disease.

All that we can hope to discover is, the first effect of disease,—its real cause is, and, without some addition to the means of investigation which we at present possess, must ever remain, unknown. It would therefore be a fruitless expenditure of time to prolong researches after the real cause of hooping-cough. We proceed then at once briefly to inquire into its first or immediate effects, which, after all, seem to be what is generally implied in speaking of the *cause* of any disease.

It is evident from what has gone before, that the first effect of the unknown cause of hooping-cough is not inflammation, either of the lungs, brain, or any other organ. What attracts our attention at the commencement of the disease is, a cough similar to that which is avowedly recognized as spasmodic, manifesting itself by long-continued expirations, and characterized by a peculiar sound which cannot be produced by any voluntary effort we can make.

These forced expirations are very unlike those of an ordinary cough, and cannot, as has already been stated, be effected by the action of the voluntary muscles of respiration only. In healthy respiration, the air is expired very gently by the compression which the lungs experience when the muscles which dilate the chest during inspiration relax their action, and the chest subsides by its elasticity to its natural dimensions. In the expiration of coughing, the air is expelled with force, because some of the muscles of respiration act violently, and, reducing still more the capacity of the chest, produce a greater degree of compression on the

lungs. When a foreign body enters the trachea it is expelled with greater violence than the muscles of expiration could exert upon it. The expulsion must therefore be aided by a spasmodic action of the muscles which connect the extremities of the cartilaginous portions of the trachea. In all these cases, the progress of the air in its passage from the lungs increases in velocity in issuing through the trachea, because the latter is a tube whose calibre is much less than that of the aggregate of all the bronchial tubes through which it is first driven; just as the current of sand is more rapid in its passage through the waist of an hour-glass than in its progress down the sides of the cone.

The expiratory efforts of hooping-cough resemble so much those made to expel a foreign body, that we cannot but conceive they are effected in the same way—viz., by the violent exertion of one set of muscles and the spasmodic action of another. It may be truly said, that, as muscles can only be excited to spasm through the medium of their nerves, the brain may be primarily affected by the poison which gives rise to the disease; and, on this account, the application of leeches to the forehead, as recommended by Dr. Webster, may, in many cases, be attended with such good effects. But as the brain is not organically affected, as far as we can perceive, and children are frequently met with whose delicacy of constitution forbids the abstraction of even the smallest quantity of blood, the application of leeches is certainly not a desirable remedy to have recourse to in every instance. There is therefore wanting some remedy of more general application.

We cannot, I fear, assign any cause for the extraordinary muscular action of which we have been speaking; nor yet

explain the circumstance of the cough coming on at certain intervals. All we know is, that a spasmodic affection of the muscles in question, and a slight inflammation of the air passages, are the first effects produced by the cause of hooping-cough when that disease exists without complication; and that the violence with which the blood is driven throughout the body frequently causes inflammation of some other parts, and by degrees brings on that fearful train of consequences which we have seen to be so often the result of the long continuance of the cough.

Our first object, therefore, should be to put a stop to the nervous affection or spasm, and thereby to cut short the disease, and prevent it from extending into those complications which are the real source of danger; and this is the prominent feature of that system of treatment which I have generally found to be the most successful.

Since the manuscript was prepared for the press, a friend to whom it was submitted has referred me to an Essay on this subject by Mons. Blache, which I had not before seen, and which has furnished me with three of the cases set forth in the third chapter. His sentiments exhibit a somewhat remarkable agreement with my own; and the conclusion he arrives at is so precisely the same as that to which my observations have led me, that I have great pleasure in bringing forward his authority in corroboration of my views. The conviction he has expressed as to the nature and seat of the disease (and wherein he coincides substantially with Albers of Brême, Laënnec, and Pinel,) is, that hooping-cough must be considered "as *a nervous affection, having its seat both in the mucous membrane of the bronchiæ and in the pneumo-gastric nerves: an affection very frequently complicated*

*with bronchitis and with pneumonia, but which may exist without them; and, like all other diseases of the same kind, having no anatomical marks of any importance."**

* "On doit être amené, suivant nous, à considérer la coqueluche, comme *une névrose dont le siège est à la fois dans la membrane muqueuse des bronches et dans les nerfs pneumo-gastriques : névrose très-fréquemment compliquée de bronchite et de pneumonie ; mais pouvant exister sans elles ; et, comme toutes les maladies de même nature, n'ayant aucun caractère anatomique appréciable.*"—De la Coqueluche; mémoire qui a remporté le prix proposé par la Société de Médecine de Lyon; par M. Blache, Docteur en Médecine, Médecin du Bureau Central des Hôpitaux de Paris. *Arch. Gén. de Méd.* 1833. *II^e Série. Tome III.*

CHAPTER VI.

CONTAGIOUS NATURE OF HOOPING-COUGH.

Contagion denied, because diseases supposed to be contagious are not always communicated—Fallacy of this argument shewn—All diseases must have an origin in circumstances—Some of them may also be communicable—Hooping-cough contagious—epidemic.

Attempts have frequently been made to prove that those diseases which, by common consent, are considered to be contagious cannot be communicated from one person to another; and the argument usually advanced in support of this position is, that healthy persons are continually coming in contact with those who are suffering from what are called contagious diseases, and yet remain wholly unaffected by them. A very striking instance in favour of this argument came under my own observation a few years since. Two or three children of a family with whom I was acquainted travelled from London to Liverpool in a stage-coach, in company with some other children who were at the time suffering from hooping-cough, and yet did not take the disease. But any number of such instances would only prove,

that a disease supposed to be contagious is not invariably communicated to every individual who comes within the reach of its influence, and that all persons are not at all times susceptible of such diseases; assuredly they would not prove that the disease was wholly incapable of being communicated by contact. One positive is worth many negative arguments; and numberless instances may be adduced in which persons, previously in perfect health, after having come within a certain distance of others labouring under particular disorders, have been sensibly affected at the time, and have returned home to suffer from the same malady. Thus, a lady of my acquaintance meeting in the street a person who was just recovering from an attack of small-pox, and was strongly marked by it, said to her companion, "I have taken that disease;" and shortly after her arrival at home was seized with shivering, which was followed by fever, and a very severe attack of small-pox.

To instances such as the above, of apparent infection by diseases whose contagiousness is less certain than that of small-pox,—to instances, for example, of apparently communicated hooping-cough,—non-contagionists reply, that all persons affected with the same disease must have derived it from the same or a similar cause, or causes; and that before it can be admitted that a disease has, in any particular case, arisen from contagion, it must be proved that none of the circumstances originally capable of producing it have been in operation. But this would be to require a proof of a negative position, of all proofs the most difficult, and especially when the point to be established is the absence of *unknown* circumstances. The premises, then, which are assumed by the supporters of this theory are, I conceive, inadmissible; for though it is clear that the man who was first

affected with any disease must have derived it from some other cause than contagion, this only proves that some other cause or causes of disease must exist besides contagion, but it affords no evidence that any disease, after it has been produced, may not be communicated from an infected to a healthy individual: the admission, therefore, that any diseases may have their origin independent of specific miasms is not an argument against the position, that those diseases may be propagated by contagion.

That hooping-cough may be communicated by this means is borne out by the fact, that children who were previously in perfect health, having no cold or cough, after playing with other children suffering from this disease, are themselves attacked by it, and that all the other children in the same house are soon after seized with it, as well as many others, both children and adults, who come in contact with them. Dr. Hamilton, in his work on the Diseases of Infancy and Childhood, p. 170, mentions, that infants a few days after birth have been affected with hooping-cough, in consequence of being handled by persons who had been in a house where that disease was prevailing.

M. Rostan gives an instance of its contagious nature in his Cours de Méd. Clinique, vol. ii. p. 552:—A family on going to their country seat found their gardener's children in the hooping-cough; in a few days one of the family, a boy of four years of age, who had been playing with the infected children, contracted the disease, but the other children, who were kept separate from them, did not then take it; and afterwards the whole family—father, mother, servants, and children—who had any communication with the infected family, went through the disease.

But the rapidity with which hooping-cough spreads

through a country cannot be explained by the supposition that it is communicated by contagion only. It makes its appearance at certain periods, attacking at the same time many of the inhabitants of a district, without distinction of sex or age, generally, however, selecting children as the objects of its violence; and after pursuing its ravages for an indefinite period, at length takes its departure without any assignable cause for either its appearance or cessation.

Dr. Watt, in his Treatise, p. 25, gives an account of the appearance of hooping-cough in a situation where it did not seem probable that any individual could have received it by contagion. He has taken it from a paper of Dr. A. C. Willey's, of Block Island, published in the American Medical Repository, vol. x. p. 95, in which he says—Hooping-cough occurred in that place in April, 1805, and did not become wholly extinct till Autumn: what he considered as particularly worthy of attention was, the fact of its being indigenous, appearing over the greater part of the island at the same time, and being untraceable to any apparent source. The insulated situation of the place being extremely favourable to observations and the detection of facts of this nature, without the danger of deception, has afforded in the present instance a fair demonstration that hooping-cough can originate without contagion; he concludes thus:—"Indeed, I was inclined to believe that the rise and progress of this epidemic disease does not depend so much upon contagion as is generally imagined. The universal belief that the system, during the operation of pertussis, generates a specific virus, capable of communicating the disease, seems to have prevented the mind from looking any further for a principle adequate to its production."

Such facts as these, and there are many, leave scarcely

any room for doubting that hooping-cough is an epidemic, as well as a contagious disease. This view is strengthened by the fact, that it is much more severe and fatal at one time than at another. Like other epidemics, it has appeared in various parts of Europe at different times. At its commencement, the number who fell victims to it was very great, but towards its decline it became mild, occasioned little suffering, and left the subjects of its attacks very little injured in health or constitution. We may therefore consider that hooping-cough is an epidemic disease, but that it may also be communicated from diseased to healthy individuals by contagion.

CHAPTER VII.

RECOMMENDATIONS OF VARIOUS AUTHORS FOR THE TREATMENT OF HOOPING-COUGH.

No specific plan of treatment possible—Hooping-cough often exhibits great variety of symptoms—Medicines of opposite effects accordingly often requisite—Circumstances under which any remedy was found useful necessary to be known—Medicines prescribed, and by whom.

It is impossible to lay down any specific plan for the treatment of a disease which, in the course of its progress, exhibits such a variety of symptoms, and causes death in so many ways, as the one which is now under consideration. Medicines calculated to remove one class of symptoms may be either inefficacious or decidedly injurious when another class is present. For example, a remedy which is found useful for the cough has scarcely any effect upon it when an inflamed condition of the lungs has supervened; and that which is necessary for the treatment of the complaint when complicated with hydrocephalus, or pneumonia, may prove fatal if exhibited when it exists in its simple form.

The medicines which have been recommended by the writers on this subject who preceded Dr. Watt, produce

such opposite effects upon the human system, that one might be led to suppose that to establish the utility of one would be to prove the injurious effects of another. Tonics, as bark and arsenic,—stimulants, as ether and cantharides,—nauseating medicines, as tartar emetic and ipecacuanha,—and depressing remedies, as hemlock, lead, and deadly nightshade,—have all been represented to have the power of alleviating, or cutting short, this complaint. But to know that these medicines are remedies,—if indeed they be such,—affords but little insight into the best method of treating this disease, unless the peculiar circumstances under which they have been found useful be at the same time clearly pointed out. Of what practical benefit can it be to be told that hemlock is a cure for children labouring under hooping-cough, unless it can be shewn that it cures every case, or the symptoms for which it is beneficial be carefully described? The same may be said of all those other agents which produce so powerful an effect upon the human system as to render them either decidedly useful or decidedly injurious.

Nevertheless, as these medicines are recommended by physicians of high standing and great respectability, and as it is very unwise to reject any one of them as useless because we cannot understand the rationale of its operation, I shall describe the effects which these medicines have been said by their respective advocates to produce.

The principal medicines in general use for the treatment of hooping-cough are—

1. Opium, and its compounds.
2. Lactuca Virosa.
3. Emetics.
4. Acetate of Lead.

5. Hemlock, and its compounds.
6. Tincture of Cantharides, and compounds.
7. Arsenic.
8. Belladonna.
9. Narcissus.
10. Sulphuret of Potash.
11. Laurel Water.
12. Hydro-cyanic Acid.
13. Embrocations.
14. Vapours of Tar.

I. *Opium* is a popular remedy as a topical application; it is also given internally to allay the cough. Dr. Cullen says, first lines, section 1424, "of anti-spasmodics, the most certainly powerful is opium; and when there is no considerable fever, or difficulty of breathing, present, opium has often proved useful in moderating the chin-cough; but I have not known it employed so as entirely to cure the disease."

Small doses of opium combined with antimony very often quiet the cough, when in the early stage of the disease it is hard and dry, with easy and natural respiration; but if any symptom of inflammation of the lungs, or brain, be present, the use of it is contra-indicated. Dr. Richard Pearson, in a paper published in the Transactions of the Medico-Chirurgical Society of London, vol. i. p. 25, recommended for a child between one and two years old, one drop of tincture of opium, five drops of ipecacuanha wine, and two grains of prepared natron, repeated every fourth hour for several days, taking care to remove costiveness whenever it occurred by rhubarb and calomel; but he did not say in what time it cured the disease. It is a medicine, of all others, which requires to be given with the greatest caution. In the early

stage of the disease, if fever be present, with difficulty of breathing, and an accumulation of mucus in the bronchial tubes, opium will prove very injurious; but in a later stage, when those symptoms are absent, and a troublesome cough remains, opium will often have the effect of allaying it. Mr. Warren says—"Liquid laudanum rubbed all over the abdomen and pit of the stomach twice a day gives great relief." This is a very safe mode of using opium, but one upon which we cannot rely with any degree of certainty.

2. *The Extractum Lactucæ Virosæ* is strongly recommended by Dr. Gumprechte. His paper will be found in the sixth volume of the Transactions of the Medico-Chirurgical Society, p. 608—"The first, or catarrhal, stage," he says, "is inflammatory, and ought to be opposed with mild antiphlogistic, diaphoretic, and demulcent medicines." In the second, or what he calls the convulsive stage, he recommends half a grain of the above medicine, with sugar, three times a day, for children of two years of age. He gives two cases of hooping-cough, for one of which he prescribed half a grain every two hours, from the 2nd to the 15th of July, when the hooping was cured, and a catarrhal cough only remained; for the other he prescribed the same dose at similar intervals on the 5th of January, and on the 28th a catarrhal cough only remained. He says, "the lactuca virosa has a considerable effect upon the skin, is a powerful anodyne, and a strong diuretic." It seems likely to be useful where opium is indicated.

3. *Emetics* have been recommended by Astruc, Dr. Cullen, Dr. Hamilton, and Mr. Burns, as cures for this complaint. Dr. Watt says, page 209 of his Treatise—"Their action is to relieve the stomach and bowels from vitiated secretions, determining to the surface, and removing the

spasm of the extreme vessels. When the secretion from the inflamed membrane comes on slowly, it promotes it; and when it comes too profuse, no medicines are equally efficacious for its expectoration."

I believe emetics to be not only useless, but absolutely injurious in the early stage of the complaint. When, however, the respiration becomes short and rapid in consequence of the accumulation of mucus in the bronchiæ, emetics are the most useful of all remedies.

After full vomiting has taken place, the respiration becomes easy, and the wheezing is no longer heard. This comparative state of ease may last for some days, till an accumulation of mucus is again formed, when the symptoms will recur; but the same remedy will again remove them. It should, however, be distinctly borne in mind, that emetics are only to be given to relieve the symptoms already described, not with the hope of curing the disease; for their frequent exhibition exhausts the patient very unnecessarily, and rather lengthens than shortens the duration of the complaint. The best form is that which is recommended by Dr. Watt—five grains of ipecacuanha and one grain of tartar emetic, for children; but the dose should be large enough not merely to discharge the contents of the stomach, but to get rid of the ropy mucus which obstructs the bronchial tubes. Dr. Watt most truly remarks, that "when food only is rejected, the patient feels more exhausted, while the weight and oppression about the præcordia remain nearly the same as if no vomiting had taken place."

4. *Acetate of Lead* has been highly recommended by Dr. Reece, in the Medical and Chirurgical Review, vol. xv. p. 37. He commenced by giving to a child of four years old a teaspoonful of the following mixture every six hours:—

Acetate of lead, five grains; syrup of violets, two drachms; rose-water, two ounces. The cough being on the following day less frequent, he increased the doses to two teaspoonfuls every six hours. After the *first* dose, the child was not heard to whoop, and after two days more the cough entirely ceased; the child's health, which for some time had been bad, was evidently improved by it.—I have never made trial of this medicine, I cannot therefore do more than give Dr. Reece's opinion of its efficacy.

5. *Hemlock* is a remedy concerning the utility of which there is great difference of opinion. Dr. Bulter, Dr. Armstrong, and Dr. Hamilton, speak of it as having the power of lessening the violence and frequency of hooping-cough. Dr. Bulter says, (Treatise on Kink-Cough, p. 181,) that, under the use of this remedy, the kinks abate daily in force and frequency, and the cough is generally removed, together with all its concomitant symptoms excepting slight cough, in the space of a week. The dose which he gave to a child under two years of age was one grain daily, infused in an ounce and a half of water.

In doses of a grain, with five drops of ipecacuanha wine, every fourth hour, I have found it often very useful in cutting short the cough; and though the combination sometimes fails to produce any beneficial effect upon the disease, I believe its failure arises from the bad quality of the medicines; for it is known to be so useful that it was introduced into the last edition of the London Pharmacopœia.

6. *Tincture of Cantharides.*—A most flattering account is given of a combination of this medicine with bark and camphor in this complaint, Watt's Treatise, p. 280. Dr. Burton, of York, prescribes a scruple of cantharides, and a scruple of camphor, to be well mixed with three drachms of

the extract of bark ; and eight or ten grains of this mixture to be given to children every third or fourth hour in a spoonful of water, in which a little of balsam of copaiba was dissolved. Another form for the use of the same medicine has been recommended by Mr. Sutliffe, of Settle—paregoric elixir, half an ounce ; tincture of bark, half an ounce ; tincture of cantharides, one drachm ;—small doses of this mixture to be given three or four times a day, and gradually increased till a slight strangury is excited ; then the dose is to be diminished, or taken at more distant intervals. The hooping is said to have been cured in six days from the exhibition of this medicine.

I have tried this remedy in a few cases, but did not perceive that it produced any good effect on the disease.

7. *Arsenic.*—Dr. Ferrier, who has paid great attention to the treatment of this disease, thinks that "the only remedy which promises to shorten the disorder effectually is the solution of white arsenic," (Medical Histories and Reflections, vol. iii. p. 221.) I have employed this medicine in several cases of Infirmary patients with tolerable success ; and I have occasionally given it in private practice with so much advantage that I think it deserving of further trial. The dose with which I generally begin is, one drop daily, for an infant ; and for children under seven, two drops ; repeated according to the state of the symptoms. It requires some caution to avoid the accumulated action of this medicine. The exhibition of the solution should be suspended occasionally for a day, or more, and the bowels should be gently opened by means of calomel. Mr. Simmons, of Manchester, in a letter to Dr. Duncan, gives the following account of the benefit to be derived from the use of arsenic in the treatment of chin-cough :—"For upwards

of three years I have given arsenic in the hooping-cough with the most salutary effect. In general it has put a stop to the disease in about a fortnight; and it has never failed to moderate it in a few days. I have administered it in one unsuccessful case only, and even then it afforded considerable relief; and, had I been called in earlier, or had I been permitted to pay the attention the case required, I am of opinion it would have succeeded in this also."—I have employed Fowler's solution of arsenic in some cases without any benefit; but I believe it may be useful where bark and tonics are indicated.

8. *Belladonna.*—The extract and fresh powder of belladonna, given in doses of the eighth of a grain, up to half a grain, night and morning, has been for some years recommended as a remedy for hooping-cough. Laënnec says, (*Traité de l'Auscultation Médiate*, p. 191,) "after the exhibition of emetics, belladonna is one of the means which contribute most decidedly to calm the violence and shorten the duration of the cough; it diminishes the desire and the want of respiration, and consequently the dyspnœa, more constantly than any other narcotic plant; it appears, like other remedies of this kind, to overcome the spasms of the bronchiæ, and to lessen the irritation which produces sanguineous and serous congestion, as well as an increase of the secretion of the bronchial membrane."—I cannot say that I feel much confidence in belladonna: it is very inferior to other remedies.

9. *Narcissus.*—Of the extract of narcissus, and the infusion of the petals of the same plant, Laënnec says, that "some years it is a sort of specific against hooping-cough. I have performed cures by the use of this plant alone with surprising rapidity, in five or six days; but in general I have

found it less efficacious than belladonna."—Of the use of this medicine I know nothing from experience.

10. *Sulphuret of Potash* was recommended as a cure for hooping-cough by M. Blaud, physician in chief to the Hôpital Beaucaire. He published a paper in the *Revue Médicale*, which was copied into the *Lancet* of the 23rd April, 1831, in which he states, that after having given one grain of the extract of belladonna to an adult for eleven days without any mitigation of the complaint, he prescribed ten grains of the sulphuret of potash mixed with honey, to be taken night and morning, and that the improvement was immediately perceptible, and in seven days the cure was completed. In another case, in which the symptoms were so violent as to require venesection, and for which he had prescribed belladonna without any benefit, he gave ten grains of sulphuret of potash daily, and in twenty-five days the cure was completed.—The disagreeable taste of this medicine has prevented me from using it.

11. *Laurel Water.*—"Water distilled from the common laurel, thickened and not filtered, has produced the best results during the convulsive period, in the hands of M. Carron du Villards. He advises it to be given in doses of six drops every two hours, and of half a drachm to adults. M. Jœrg, of Leipzig, accuses it of increasing the cough. Drs. Krimer, de Halles, and Brofferio particularly recommend the inhalation of the vapour of the distilled water; a drachm should be used at each fumigation, which ought to occupy five, ten, or fifteen minutes."—*Dictionnaire de Médecine ou Répertoire Général des Sciences Medicales*, p. 38.

12. *Hydro-cyanic Acid*,—"a powerful medicine, whose sedative influence on the nervous system is generally known,

—has produced wonderful results in the hooping-cough, if we can credit the encomiums given to it by its advocates, especially M. Fontaneilles, who says that he has cured four children of the same family *in a few days* by this remedy. MM. Coullon, in 1808, and Heincken, Dr. Granville, and MM. Behr and Hayward, have also related facts in favour of this therapeutic agent. During the prevalence of the hooping-cough at Philadelphia in 1824, Dr. Edwin Altée gave one of his children who was affected with it the following mixture, in small spoonfuls, every morning and evening:—Prussic acid, 6 drops; simple syrup, 2 drachms. At the end of *a week* the symptoms had very nearly disappeared, and the cure was speedily completed. This decisive success encouraged him to persevere in his experiments; and from that year till 1832, he says that he had treated more than TWO HUNDRED patients in this manner. He had never failed, and the cure had always been completed in fourteen or fifteen days at the utmost. It was in the second period that he prescribed it, after having had recourse to bleeding, vomiting, and purging, according to the symptoms. The acid which he made use of only contains four and a half per cent. of pure acid of M. Gay-Lussac. For an infant of six months he put a drop of the acid into an ounce of syrup, and gave a tea-spoonful of this mixture twice a day; if in forty-eight hours the remedy produced neither uneasiness nor giddiness, he gave three spoonfuls a day. For a child from one to two years old, two drops were mixed in the same manner; to each mixture an additional drop was added: for patients from twelve to fifteen years of age, six drops were prescribed in an ounce of syrup." (*Idem.*)

Dr. Muhrbeck recommends, in 1829, hydro-cyanic acid

as a specific in the second stage of hooping-cough, or when the breathing becomes difficult and the cough convulsive.—*American Journal of the Medical Sciences*, vol. 7, p. 842.

13. *Embrocations* are a popular remedy in the treatment of hooping-cough. Rubbing the spine with rectified oil of amber, Roche's embrocation, and garlic ointment, is said to be useful in mitigating the cough. Dr. Struve, of Gorlitz, made use of the following mixture, which he directed to be rubbed in every two hours about the region of the stomach:—

℞	Antimonii-tartarizati . . .	℈i
	Tincturæ cantharidis . . .	ʒi
	Aquæ	ʒij

In a variety of instances, a gentle perspiration came on during the night after the use of this application; the violence of the cough abated; and in a short time the symptoms totally disappeared.—*Medical and Physical Journal*, vol. 1, p. 84.

M. Goodwin suggests a mode of applying tartar-emetic, which produces the peculiar small-pox eruption more speedily than when it is used as an ointment. To a drachm of tartar-emetic he adds half an ounce of camphorated spirit of wine, and a pound of warm water. Pieces of calico dipped in this solution are to be applied to the part intended to be affected several times a day. "The stimulus from this application," says M. Goodwin, "produced an uncommonly violent eruption on the skin, in a short time having the peculiar malignant appearance of carbuncles, itching and smarting excessively, many of which suppurated, while hundreds were continually rising up, some as large as peas, others as small as pin heads."—*Idem*. vol. 6, p. 321.

14. *Vapours of Tar.*—Dr. Watt speaks very highly of the effect of inhalation of these vapours in many cases; but candidly informs us that it was useless in some cases, and injurious in others. The following is his description of the mode of using it, (pp. 267, 270) :—"About a quart of tar is placed in the middle of a small room. This is stirred round with a succession of red-hot pokers till the fumes fill the apartment like a pretty thick fog. It is difficult to fix the criterion for this part of the process. I have generally made it so strong as to feel somewhat disagreeable to the lungs, but not more than I could bear without much difficulty for an hour. It very soon begins to affect the mucous membrane of the nose, and, however sound the lungs may be, to excite some degree of coughing. This is chiefly the case at first, after some time it becomes much more easy." "There is in almost every case, a period of from one to three weeks, after the kinks are formed, before any considerable degree of fever commences. This is the period, when the fumigation should be adopted, and where, so far as my experience goes, it will always be successful."

CHAPTER VIII.

SIMPLE HOOPING-COUGH.

Definition—Symptoms and character—Stethoscopic examination—Treatment must vary according to the nature of the epidemic—Course recommended for the common form of the disease—When emetics useful—Circumstances under which hydro-cyanic acid is injurious—Treatment in such cases—Diet and other auxiliary measures—Change of air considered; no cure; when beneficial—Relapses less frequent after a speedy cure—Hydro-cyanic acid not suggested as a cure for every case—Success of it depends much upon its quality—Cases—Reflections thereon.

The description which has been given of the progress of hooping-cough will shew that the symptoms are by no means the same in all cases. The physical signs of its existence are different, and the changes of structure produced by the long continuance of the complaint affect several organs of the body; from which it is plain that the disease may exist under a variety of forms. Sometimes it appears simply, with little or no alteration of any structure; at other times in combination with inflammation of the lungs, or bronchiæ; congestion of the vessels of the head; inflammation of the arachnoid membrane; and also

with fever of the typhoid kind. The information we have to seek for, therefore, is, a knowledge of those remedies which have been found useful in each of these varied forms. In pursuing this inquiry, I propose first to consider hooping-cough as simple, and next to treat of it under its several complications.

Hooping-cough may, for practical purposes, be considered simple when no organic affection exists in combination with it, except a slight catarrh. This form of the disease usually occurs in healthy, well-formed children, and generally terminates without causing any formidable change of structure. It commences as a common cold, with slight running of the eyes and nose, and a hard dry cough, which in a few days betrays its real character by the peculiarity of its sound, and by its coming on in paroxysms, leaving no doubt as to the nature of the disease before the whoop has been heard. During the paroxysm, the face and ears become livid, the eyes are suffused with blood, and the patient appears in imminent danger of immediate suffocation; but when it is over the countenance assumes its natural colour and appearance, and the child feels perfectly well. The interval between the paroxysms varies from one hour to three or four. The child has evidently some warning of the approach of the attack, as shortly before it commences he reddens with passion and struggles for some time to suppress the cough; soon, however, he is overpowered by it, and clasps his arms round his nurse's neck, or, if old enough, lays hold of a chair or table, in order to support his frame, and be able to dilate his chest more fully by fixing a point from which the muscles of respiration can act.

In this form of the complaint the appetite is good, the

bowels costive, the skin cool, pulse natural, and no fever is present. After the continuance of the cough for two or three weeks hooping commences; but there are cases in which it never takes place during the whole course of the disease. The expectoration at first consists of a little thin colourless mucus, but by degrees the sputa becomes more abundant, and more tenacious, of a white colour, and mixed with air bubbles. The mildest form of this complaint generally lasts, under the ordinary treatment, from two to four months, varying in intensity according to circumstances. It is manifestly aggravated by excitement and exposure to cold, and also after a full meal; it is less severe in warm than in cold weather; and is worse during the night than in the day.

Stethoscopic Examination.—If a child labouring under this form of the complaint be examined with a stethoscope, nothing is to be perceived but the shock which the cough gives to the whole body, and a loud rush of air at the time that the hooping inspiration is made. During the interval the respiratory murmur is easy and natural, differing little from what is heard in perfect health. Occasionally, slight mucous râle accompanies the inspirations; but these are not repeated with more than ordinary frequency.

Treatment.—The measures to be adopted for the treatment of hooping-cough must be influenced very much by the nature of the prevailing epidemic. In some seasons, almost all patients attacked by this disease are affected with febrile symptoms, which of themselves require special treatment; in others, they are so much depressed that sedative remedies, if given, must be administered to them with great caution. In laying down, therefore, a plan of treatment for this disease, we must consider it as existing

under its common and usual form, always bearing in mind that the course recommended may require modification according to the special character in which the epidemic may appear.

The only organic affections which we can discover in these simple cases are, a slight catarrh, and a spasmodic constriction of the bronchial tubes; the most urgent symptom is the cough. The indications, therefore, to be followed are, to restore the mucous membrane to its healthy state, to subdue the spasm, and to allay the cough. In the early stage of the complaint, whilst its nature is still doubtful, warm mucilaginous drinks, with a combination of extract of hemlock and ipecacuanha wine, in doses of one grain of the former and three or four drops of the latter, usually relieve the catarrhal symptoms; but they very rarely either cut short the disease or prevent the accession of the whoop. The medicines which have proved most effectual in fulfilling the indications above mentioned are, hydro-cyanic acid, combined with ipecacuanha, or tartarized antimony. Two or three days after their exhibition, the violence of the paroxysm is perceptibly diminished and its duration shortened; and at the end of five or six days the whoop usually ceases. The intervals between the paroxysms grow longer, and at the end of a fortnight, if the weather be warm, and the general treatment recommended at the close of this treatise be adopted, they will, in many cases, only return in the mornings and evenings.

The dose of hydro-cyanic acid for an infant is about three-quarters of a minim of Scheele's strength, gradually increased to a minim, which may be given every fourth hour; for a child of three years of age, about one minim, gradually increased, if necessary, to a minim and a half, every fourth

hour; for children of ten or twelve years of age, a minim and a half, increased to two minims, every fourth hour. It is safer to give this medicine in small doses at very short intervals, than to run any risk of producing too great depression by a large dose. The frequency of its exhibition must depend upon the strength of the patient and the severity of the attack. The dose should be repeated when the effects begin to subside, which, in mild cases, generally happens in three or four hours: but when much fever is present, its influence is felt but a very short time; under such circumstances, a larger quantity may be given, and at shorter intervals, without any apprehension of danger, *so long as the fever lasts.* In some very severe cases, when the pulse was up to 120, with a good deal of fever and a very hot skin, I have given to a girl of ten years of age a minim and a half of this medicine every quarter of an hour for twelve hours; at the end of twenty-four hours she was free from fever, and her strength was not in the least reduced by the effects of the remedy. As some catarrhal symptoms are generally present, a few drops of ipecacuanha, or antimonial wine, may be advantageously combined with the hydro-cyanic acid; but the latter alone possesses the power of curing this formidable complaint. The quantity of the ipecacuanha, or antimonial wine, ought to be regulated so as *not* to produce sickness; two or three drops of either of these preparations will be sufficient for an infant, and the dose may be increased in proportion to the age.

Hemlock combined with ipecacuanha has, in some cases, a powerful effect in allaying the violence of the cough; but its influence over the complaint is, in general, very inferior to that of hydro-cyanic acid. I have, however, some-

times found, when the catarrhal symptoms were more marked than the spasmodic, that the combination in question proved more useful than the hydro-cyanic acid. The dose which I usually give to an infant is three or four drops of ipecacuanha wine with one grain of extract of hemlock, every second, third, or fourth hour, according to the severity of the case, and continued till the difficulty of breathing is relieved.

Sometimes the cough, after pursuing its ordinary course for some time, will again become hard and dry, and the paroxysms will terminate without expectoration. Such cases are most relieved by giving, in addition to hydro-cyanic acid and antimonial wine, a small quantity of laudanum, or liquor opii sedativi; for an infant, the dose of the former is about three-quarters of a minim, of the latter half a minim, every fourth hour; and for older children larger doses in proportion to their age.

When an accumulation of mucus takes place in the bronchial tubes, which is indicated by oppression and quickness of breathing, and by a wheezing noise which may be heard even at some distance from the patient, emetics are very useful in removing it; but they are by no means to be considered as remedies for the disease. Five grains of ipecacuanha powder with one grain of tartar-emetic is sufficient for a child under seven years of age; ten grains of ipecacuanha with one grain of tartar-emetic may be given to older children. If the difficulty of breathing depend on the presence of mucus, the respiration will become easy and tranquil after the operation of an emetic, and may continue so for some time; but should it again become impeded from the same cause, and the same symptoms recur, the emetic should be repeated.

Strong healthy children throw off the disease without being much weakened by it; but those of a delicate habit, after suffering from it for three or four weeks, are reduced to such a state of debility as retards, rather than favours, the cure. They cough for a considerable time feebly, as if they were endeavouring to throw up the phlegm but could not succeed; their appearance is languid, and their pulse feeble. Under such circumstances, the administration of hydro-cyanic acid aggravates the cough, and it should be immediately discontinued. When I first commenced the use of this medicine, I was surprised to find that in some cases it had the effect of diminishing the frequency and violence of the cough for a time, but that the further exhibition of it appeared rather to strengthen than remove it. Upon closely examining those cases, I perceived that the patients were already too much depressed, and that the hydro-cyanic acid added to this depression; I therefore desisted from the use of it, and gave gentle stimulants, as ammonia with opium, and a more generous diet; which soon restored the strength of the children, and removed the remains of the cough.

When such a state occurs in the course of this disease, —which is sufficiently marked by the coldness of the skin, feebleness of the pulse, languor of the eye, and the nature of the cough, which is rather teazing than violent,— compound spirit of ammonia with some preparation of opium will be found useful; three drops of the former with half a drop of the liquor opii sedativi, or three-quarters of a drop of laudanum, may be given to infants every fourth hour in a drachm of camphor mixture or the same quantity of water, and to older children, larger doses in proportion to their ages. Good beef-tea may be given to

children twice in the day instead of two of their farinaceous meals. Older children may be allowed meat once a day, with a little wine, or wine mixed with water. Under this management the cough speedily abates, and the child's strength is restored.

The cure may be greatly accelerated by attending to those auxiliary measures which experience has proved to be useful in catarrhal affections—viz., warm air, warm clothing, farinaceous diet, and mucilaginous drinks. But as children require the same general management under whatever form of the complaint they may be labouring, it will save unneccessary repetition to give the Rules for the General Treatment as a conclusion to this work.

Change of air.—This is to the present moment a very popular remedy for this disease. Dr. Heberden, as we have before seen, prescribed it in his Commentaries as the most powerful one known for effecting a speedy cure. Dr. Watt says he has seen many cases in which hooping-cough was kept remarkably mild, by having the children who were the subjects of it almost constantly in the open air from the very commencement of the attack. Some patients who set out upon a journey at the time they were suffering very severely from the disease, became better, he says, every hour as they proceeded, scarcely giving a single cough, and entirely free from fever. But he confesses that, on many occasions, children had been rendered much worse by being freely exposed to the open air. This must be the case when the atmosphere is cold and damp,—the cough is decidedly rendered worse by inhaling it; when, however, the weather is warm and dry, children will not be injured by being exposed to it; but as a cure for

hooping-cough, I am satisfied that change of air cannot be relied upon. I have frequently known it to be tried, but very seldom with success. The principal use of it I conceive to be, so to strengthen the system, exhausted by a severe and protracted cough, as to enable it to overcome the diseased habit. At the commencement of the complaint, if the child be in tolerable health, perfect quiet and a warm atmosphere contribute much more towards the cure of the disease than change of air; but if the subject be a child whose constitution is so weak as to require more attention than even the disease itself, and whose delicacy renders him unfit to contend with the malady, it may be necessary to strengthen him by all natural means, at the same time that appropriate remedies are administered. For this purpose, change of air, if it be warm summer weather, is specially useful. It is when children are very weak, whether it be at the commencement of the complaint or after a long continuance of it, that we may expect bark, arsenic, and remedies of this class to act beneficially; and the combination of hydro-cyanic acid with these tonics will often subdue the cough, whilst the system is strengthened.

For some time after the disease has been removed, exposure to cold, by producing catarrhal and bronchial affections, will reproduce the whoop; the hydro-cyanic acid, however, will again remove it.

Hooping-cough, it is well known, is very apt to recur, whether it have been left to itself, or by whatever remedies it may have been treated. The rapidity with which it is cured by hydro-cyanic acid has led to the apprehension ttha relapses after such treatment would be more frequent; but this is not found to be the case. On the contrary, they are much less frequent after a speedy than after a

protracted cure. And this is what might be reasonably expected. For the liability to a relapse appears to be in proportion to the degree in which the strength is prostrated and the affected parts are diseased; and the child's strength must be much less reduced, and the mucous membrane much less affected, when the cough lasts only for two or three weeks, than when it lingers for as many months. A speedy cure is therefore most desirable, as well to diminish the frequency of relapses, as to shorten the duration of suffering, and prevent those organic changes which are the consequence of the long continuance of the disease.

I do not wish it to be supposed by my professional brethren that I am recommending hydro-cyanic acid as a cure for every case of hooping-cough, well knowing how ready we all are to believe that what is said to cure everything, in reality cures nothing. Cases of this complaint do occur in which hydro-cyanic acid seems to possess little power over it; for such some remedy is still wanting. But I may truly say the cases are so very numerous in which this medicine succeeds,—especially if it be given at the commencement of the disease,—and so very few in which it fails of speedily producing a beneficial effect upon the cough, that my first impression on hearing that a child who has been using it is not better is, that the acid cannot have been good. Without recommending any shop in preference to another, I may say, that the acid obtained from certain Chemists seldom fails of curing hooping-cough, whilst that obtained from others makes little or no impression on the complaint. Hydro-cyanic acid of Scheele's strength will, if exhibited as soon as the whoop is heard, effect a cure in almost every case of simple hooping-cough.

If the disease has been going on for many weeks, its effects are not so immediately felt, but nevertheless it will cure in most instances.

Subjoined are the reports of some cases which exemplify the symptoms pointed out in this chapter, and the almost universal success with which the treatment recommended has been followed in this form of the disease.

CASE I.

On the 11th of January 1830, I was requested to visit the two children of the Honourable Mrs. M., residing in Piccadilly, who had been suffering for a month from hooping-cough. The elder of them, Master H. M., aged four years, a slight, delicate-looking boy, coughed and whooped very frequently, but expectorated only a little thin, watery mucus. His respiration was natural; skin cool; pulse quiet; appetite not good; bowels confined. I prescribed four grains of scammony and two grains of calomel to be taken immediately, and the following mixture:—

℞ Acidi hydro-cyanici (Scheele's) ♏xii.
Liquoris antimonii tartarizati . ʒi
Ticturæ opii camphoratæ . . ʒiiss
Misturæ camphoræ . . . . ℥viiss. M.

Fiat mistura. Capiat cochlearium magnum quartâ quâque horâ.

To be given in some warm drink. The child to remain in a warm room; and to live upon light pudding and broth.

13th. Bowels opened three times by the medicine; cough less frequent; paroxysms shorter; hooping abated.

Repetatur mistura.

14th. Has ceased to whoop; coughed only twice last night, and three or four times during the day.

Perstet.

15th.—Coughed once only last night, and very seldom to-day.

Perstet.

18th.—The cough was so slight that it was unnecessary to visit this child again; and he was quite free from it, and in good health, before the end of the second week from the day he had first taken the medicine.

His brother's case was a complication of hooping-cough with bronchitis, and will appear under that head.

The nursery-maid also took the disease in a few days after the children got well. The hydro-cyanic acid with antimonial wine, but in larger doses, was given to her, and in less than three weeks she was perfectly well. She had no relapse.

A niece and two nephews of Mrs. M., residing in the country—ages, nine, seven, and six—had been for three weeks suffering from this disorder. Medicine of the same kind, with one minim of hydro-cyanic acid for a dose, was sent down to them, and it cured all in a week or ten days.

CASE II.

Mrs. B.'s child, Master Henry B., aged between seven and eight months, residing in Great Coram Street, a healthy-looking boy, had been suffering from a cough for some days, which proved to be hooping-cough on the 18th of December 1830. On the 19th I visited him. The cough and whoop came on very frequently, but when the paroxysm was over he appeared perfectly well. Respiration easy; pulse 90; bowels open; free from fever; and the child took the breast readily. The very marked success which attended the exhibition of hydro-cyanic acid in

many cases of hooping-cough, especially in Case No. I., induced me to prescribe it for this child also.

℞ Acidi hydro-cyanici (Scheele's) ♏xii
Vini ipecacuanhæ . . . . ʒss
Aquæ destillatæ . . . . ʒii. M.

Fiat mistura. Capiat cochlearium parvum quartâ quâque horâ.
The medicine to be given in a tablespoonful of warm barley-water.

20th.—Cough rather better; in other respects the child is as he was yesterday.

Perstet.

21st.—Cough and whoop less; bowels open; secretions natural; child seems lively.

Perstet.

Each succeeding day diminished the cough and the whoop, and all anxiety was removed as to the recovery of the child: but on the 24th he seemed fretful; his breathing became rather quicker than natural; pulse a little accelerated, but weak; alæ of the nose in motion; cough and whoop more violent.

Omittatur mistura acidi hydro-cyanici.

℞ Vini ipecacuanhæ. . ʒi
Syrupi croci . . . ʒi
Aquæ destillatæ . . ʒxiv. M.

Fiat mistura. Capiat cochlearium parvum tertiâ quâque horâ.

25th.—Respiration rather easier; child seemed better.

Repetatur mistura ipecacuanhæ.

26th.—On the morning of this day he seemed improved, and coughed and hooped rather less; but towards evening the breathing became more rapid, and pulse quicker. An emetic was given, which afforded little relief. He gradually became worse, and died about ten o'clock.

I was naturally anxious to open the body of this child; but finding that the parents would be pained by it, I re-

frained from indulging my own wishes out of regard for their feelings; though their permission was granted me by a letter from the father, whose words upon the occasion I am induced, for particular reasons, to quote:—

"My dear Friend,

"We are perfectly satisfied all that could be done was done, and we were highly favoured by your constant and kind attention; further investigation could not cause more satisfaction or more composure of mind. Unless it will particularly satisfy your mind, we feel perfectly sure it was the will of the Lord, and nothing could have saved his life.

"We are, dear Sir," &c.

CASE III.

February 7th, 1831.—Ruth Fisher, aged fourteen months, a strong child, residing in Bush Court, Stoney Street, Borough, was brought to me at the Surrey Dispensary, suffering under hooping-cough. Her mother said the cough had commenced ten days before, but within the last few days had become very violent, and that, after a severe paroxysm on the previous Friday, the child had had a strong fit. The respiration was easy, accompanied with some wheezing; pulse quick; skin rather hot; bowels confined; no appearance about the child to indicate that the head was affected.

℞ Acidi hydro-cyanici (Scheele's) ♏xii
Pulv. ipecacuanhæ . . . . gr.xii
Aquæ . . . . . ʒviii. M.
Fiat mistura. Capiat cochlearium magnum secundâ quâque horâ.

℞ Hydrargyr. submur. . . . gr.ii
Pulv. scammoneæ . . . . gr.iv. M.
Fiat pulvis, quâque nocte sumendus.

10th.—Cough less frequent; paroxysms less violent; the medicine is sometimes rejected; bowels open.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Pulv. ipecacuanhæ . . . . gr.x
Aquæ . . . . . ℥viii. M.

Fiat mistura. Capiat cochlearium magnum secundâ quâque horâ.

19th.—Cough much better; hooping less; paroxysms shorter, and less violent.

Repetatur mistura.

March 3rd.—The child has gone on taking the mixture, about six times in the twenty-four hours, with daily improvement up to this period. To-day there is a good deal of wheezing in the chest; respirations frequent—forty in a minute; bowels confined.

℞ Pulv. ipecacuanhæ . . gr.v
Antimonii tartarizati . . gr.i. M.

Fiat pulvis, statim sumendus.

Pulv. scammoneæ . . gr.iv
Hydrargyr. submur. . gr.ii. M.

Fiat pulvis, hâc nocte sumendus.

Repetatur mistura cum acidi hydro-cyanici, ♏xviii.

7th.—The emetic acted well, and evacuated a considerable quantity of mucus. Respiration easy; wheezing all gone; cough very slight, and without whoop.

14th.—The patient was dismissed to-day cured. Had no relapse.

CASE IV.

On the 26th of February 1832, I visited the infant of Lady H. T., residing in Wilton Crescent; aged nearly one year, a very large, and unusually fat child. He had hooped only once or twice; his respiration was quick—50

in a minute; alæ of the nose dilating rapidly; pulse 150; skin hot; bowels open; he was fretful and uneasy, and his countenance was anxious; respiratory murmur audible all over the chest, but with scarcely any mucous râle.

The fulness of this child's habit made me fearful that the lungs would become gorged with blood in spite of every effort to save him, and therefore I asked for further advice; but it was not given me, and I was forced to undertake the painful responsibility alone.

Six leeches were applied to the chest, which bled very freely, and I prescribed—

℞ Acidi hydro-cyanici (Scheele's) ♏xii
Vini ipecacuanhæ . . . . ʒi
Aquæ destillatæ . . . . . ʒiv. M.

Fiat mistura. Capiat cochlearium medium quartâ quâque horâ.

℞ Pulv. scammoneæ . . . gr.iv
Hydrarg. submur. . . . gr.ii. M.

Fiat pulvis, statim sumendus.

Diet was restricted to three ounces of barley-gruel, or whey, or thin arrow-root, every fourth hour.

27th.—Breathing very much relieved; respiration 30; pulse 120; cough violent, but not sharp.

Repetatur mistura et pulvis purgans.

28th.—Respiration natural; pulse 100; bowels freely opened; skin cool; the child has lost the anxious, fretful look he had when first attacked; cough still troublesome.

Perstet.

29th.—Paroxysms shorter and less violent; not so much straining with the cough.

Perstet.

March 1st.—Cough decidedly better, though still severe;

bowels rather confined; but the child seems going on well.

Capiat olei ricini, ʒii, statim.
Repetatur mistura cum acidi hydro-cyanici ♏xvi.

2nd.—Breathing quicker; wheezing is heard at some distance from the child; upon applying the ear to the chest the respiratory murmur is audible everywhere, but with loud mucous râles.

℞ Pulv. ipecacuanhæ . gr.v
Antimonii tartarizati gr.i. M.
Fiat pulvis, statim sumendus. Repetatur mistura.

3rd.—A considerable quantity of mucus was evacuated by the action of the emetic. Breathing natural; wheezing all gone; cough easier.

Perstet.

From this time the child went on gradually improving; and on the 6th I left him, free from cough and in good health. He had no relapse.

CASE V.

On the 18th of April 1834, I was requested to see the children of Mr. E., residing in Cambridge Terrace, Edgware Road. Miss Agatha E., aged nine years and a half, a slight, delicate, but not unhealthy-looking girl, had an attack of measles early in December last, from which she had scarcely recovered when she was seized with a violent cough coming on in paroxysms, which manifested itself as hooping-cough on the 25th of the same month. She has, since that period, been suffering severely from it, has lost her flesh and colour, and is much weakened. The paroxysms are now frequent and violent, coming on every hour or oftener, and being particularly severe at night.

The whoop is very loud. During the intervals, the respiration is natural, pulse quiet, and skin cool; appetite very good; a good deal of frothy mucus is expectorated; chest sounds clearly on percussion everywhere; respiratory murmur audible all over the chest, with a very slight mucous râle.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ . . . . . ʒi
Misturæ camphoræ . . . . ʒxv. M.

Fiat mistura. Capiat cochlearium parvum quartâ quâque horâ.

To be given in some warm drink. Warm farinaceous diet. To remain in a warm room.

19th.—Cough decidedly better; paroxysms less frequent and shorter; whoop still heard.

Repetatur mistura cum acidi hydro-cyanici ♏xx.

23rd.—The whoop has ceased; the interval between the paroxysms is sometimes as much as three hours; fits shorter and less violent.

Perstet.

27th.—Sleeps well; coughs only once in the night, and seldom more than twice in a day.

Perstet.

May 1st.—Has gone on improving rapidly since last report, and is now perfectly free from cough, and looking well.

She continued to improve in health by degrees, and had no relapse.

Master David E., aged six years, a slight-made boy, was also suffering severely from the same disease, which had succeeded to an attack of measles. His breathing was easy; pulse quiet; tongue clean; bowels open; no unnatural sounds heard on auscultation. The same medicine was given to him every fourth hour, with warm drink, and in ten days he was quite well.

Master Edward E., aged two years, had been also attacked with hooping-cough, as he was recovering from measles. There was no affection of the chest. He also took the same medicine with three-fourths of a minim for a dose every fourth hour, and in fourteen days was perfectly cured.

One child of this family had the disorder very badly; but it was complicated with bronchitis, and will appear as one of the cases of that class.

CASE VI.

November 12th, 1836.—Miss Charlotte E., aged five years, residing in Berners Street, a healthy-looking child, has been suffering for the last ten days from a severe cough, which came on in paroxysms, and is now accompanied by a whoop. Her respirations are hurried—thirty-five in a minute; pulse 100; skin rather hot; bowels open; appetite not bad; tongue clean and red; respiratory murmur is audible over every part of the chest, accompanied by slight mucous râles; a little soreness felt about the epigastrium when a full inspiration is taken.

Applicentur hirudines vi. sterno.

℞ Acidi hydro-cyanici (Scheele's) ♏xx
Liquoris antimonii tartarizati . ʒiss
Vini ipecacuanhæ . . . . ʒiss
Aquæ . . . . . ʒxiii. M.

Fiat mistura. Capiat cochlearium parvum secundâ quâque horâ.

Hydrargyr. subm. gr.ii; pulv. scammoneæ gr.vi; statim.

A tea-cup of arrow-root, sago, or gruel, every fourth hour. The medicine to be given in some warm liquid.

13th.—Breathing very much relieved; skin cooler;

pulse 90; sense of soreness gone; cough the same; whoop violent.

Repetatur mistura.

14th.—Breathing natural; pulse 84; skin cool; bowels open; appetite good; cough less; the paroxysms shorter and less violent, but still accompanied by a whoop.

Perstet.

19th.—Whoop altogether ceased; cough much less frequent—seldom more than three times in the twenty-four hours.

Repetatur mistura.

26th.—Has gone on improving since the 19th, the cough becoming daily less violent, the paroxysms shorter, and the intervals longer. She seems now free from cough, and in good health. The medicine was left off without any return of the complaint. There was no relapse in this case.

Miss Mary E., aged seven years, has had a cough for the last fortnight, which comes on in paroxysms. She now whoops slightly with the cough; respiration natural; pulse quiet during the intervals; appetite good; bowels open.

℞ Acidi hydro-cyanici (Scheele's) ♏xx
Vini ipecacuanhæ . . . . ʒiv
Aquæ . . . . . ʒxii. M.

Fiat mistura. Capiat cochlearium parvum quartis horis.

℞ Hyd. submur. . . . . gr.ii
Pulv. rhei . . . . . gr.viii.

Fiat pulvis, hâc nocte sumendus.

Farinaceous diet.

14th.—Cough much better; paroxysms shorter, and less violent.

Perstet.

19th.—Has ceased to whoop; coughs very little; appears perfectly well.

Perstet.

26th.—Has been for some days free from cough, and living as usual.

Master Alfred E., aged three years, affected in a similar way; coughing violently, hooping slightly, and in the intervals perfectly well. He was put on low diet, with warm drink; the same medicine was administered; and in ten days he was perfectly well.

CASE VII.

The children of Lady J. S., then residing at Camden Hill, Kennington, were all attacked with a cough about the middle of December 1831, which proved to be hooping-cough towards the end of the month. Miss M. S., aged eleven years, a slightly-formed girl, coughed and hooped violently, and expectorated a little watery mucus. The intervals between the paroxysms were about three hours during the day, but not more than two hours during the night. When the fit was over she appeared perfectly well; her respiration was easy and natural; pulse quiet; skin cool; tongue clean; bowels confined; appetite good.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ . . . . ℥iiss
Syrupi croci . . . . . ℥ii
Aquæ destillatæ . . . . . ℥viiss. M.

Fiat mistura. Capiat cochlearium magnum quartis horis.
To be given in some warm liquid.

Pulv. rhei gr.viii; hyd. sub. gr.ii; hâc nocte.

Low diet. To remain in bed, in a warm room.

7th.—Cough rather better; paroxysms less violent, but accompanied with whoop.

Perstet.

10th.—Intervals longer, but cough still severe; whoop less violent; health good.

Perstet.

14th.—Coughed and hooped only twice during last night; paroxysms much less frequent, and less violent during the day.

21st.—Much the same as the last report.

Repetatur mistura cum acidi hydro-cyanici ♏xxiv.

24th.—The cough seems better since the increase of the medicine, and the whoop less violent.

Perstet.

28th.—Not much progress since last report.

Repetatur mistura cum acidi hydro-cyanici ♏xxxii.

February 1st.—Cough seems more frequent, whoop still heard; pulse very weak; on the whole she seems weaker, and not so well in health.

Perstet.

5th.—Seems very languid and depressed; cough and whoop still troublesome; she is evidently worse since the increase of the hydro-cyanic acid.

Repetatur mistura, cum acidi hydro-cyanici ♏xvi. tantum.

12th.—Cough much better and less frequent; whoop seldom heard during the day; patient looks better.

Perstet.

From this time the hooping-cough ceased, the patient improved, and on the 1st of March she was well.

Master H. S., aged four years and a half, a thin and rather delicate boy, was attacked about the second week of January 1832, and took three-quarters of a minim of hydro-cyanic acid every fourth hour, under which the hooping and cough diminished. An attempt to increase the quan-

tity of the acid weakened the boy, and aggravated the disorder; but on again returning to the original dose—three-quarters of a minim—the whoop ceased, and the cough gradually got well. He was cured about the end of February.

Master J. F. S., aged seven years and a quarter, had the cough, but it affected him very little; he only hooped once or twice, and went about as usual, taking the hydrocyanic acid.

CASE VIII.

Master William S., born 4th February 1836, was suckled by his mother for twelve weeks only. He was a remarkably thin, delicate child, with such weak digestion that the simplest food, in very small quantities, frequently disagreed with him. On the 24th December 1836, he caught cold, became fretful and feverish, and had a cough. On the 25th his breathing became very quick; his pulse rapid; and his skin hotter than natural. Four drops of ipecacuanha wine were given him every four hours; but about two o'clock in the afternoon the child became so very low that this was omitted, and a few tea-spoonfuls of white wine with some warm broth were given him, by which he was revived, but his cough continued.

26th.—Hot and feverish; pulse 120, but weak; cough troublesome; the following mixture was given him:—

℞ Liquoris antimonii tartarizati ℥iv
Liquoris opii sedativi . . : ♏viii
Acidi hydro-cyanici (Scheele's) gutt.xii
Aquæ destillatæ . . . . ℥ii. M.

Fiat mistura. Capiat cochlearium parvum quartis horis.
To drink freely of linseed tea, and to remain in a warm room.

27th, Evening.—Exceedingly low, and could scarcely be roused. He was put into a warm bath, where he was seized with a violent fit of coughing, after which his extremities became cold, and he appeared to his parents to be dying. After taking a little wine he rallied, and soon became feverish, coughing as violently as before.

The medicine was discontinued, and as his breathing was very quick, a blister was applied to his chest. The hydro-cyanic acid was administered whenever he was hot and feverish, but omitted when he seemed low.

28th. — Continues very low. Towards evening his head became so hot that snow was applied to it, which seemed to relieve him. It was directed to be taken away as soon as the head cooled, but it was continued too long, and he seemed to be so much depressed by it, that from two o'clock in the afternoon of this day till next morning, he lay in an almost hopeless condition.

29th.—Finding him so exceedingly low, I gave him the following mixture:—

℞ Quininæ sulph. . ℈i
Acidi sulph. dil. . ʒss
Aquæ pimento . . ʒi. M.

Capiat gutt.xxx secundâ quâque horâ,—and frequently during the intervals pennyroyal water, warm water, and carbonate of ammonia.

About seven o'clock he revived.

30th.—He continued so very low that the quinine was continued, with the ammonia mixture in the intervals.

31st.—Better, but very low; still coughs.

Repetatur mistura quininæ.

January 1st.—Was very much excited and sleepless during the night, but not feverish. No change since yesterday.

Perstet.

3rd.—Very much composed; coughs very little.

From this time he gradually amended, and in a few days more was free from cough, and improved in health.

Miss M. S., aged nearly two years, a delicate child, but strong in comparison to her brother, was attacked with hooping-cough on 24th December 1836, but was in other respects in good health.

℞ Liquoris antimonii tartarizati ℈iv
Liquoris opii sedativi - - gutt.viii
Acidi hydro-cyanici (Scheele's) gutt.xii
Aquæ - - - - - - - - ℥ii. M.

Fiat mistura. Capiat cochlearium parvum quartis horis.

She continued the medicine for about ten days, after which she was quite well.

CASE IX.

October 8th, 1832. — Martha Weeks, aged eight months, a rather pallid-looking child, was very healthy till about fourteen days ago, when she had a slight cough, but was not in other respects ill; two days ago the mother thinks she hooped. The cough is frequent, and continues for three or four minutes at a time. Her breathing is not hurried, but the respiratory murmur is loud, and accompanied by mucous râles; pulse 100; skin not hot; bowels open.

Capiat vini ipecacuanhæ gutt.v, quartis horis.

November 2d.—The whoop is now distinct; cough frequent—every half hour; much mucous râle heard all over the chest.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - ℥i
Syrupi croci - - - - - - ℥ii
Aquæ destillatæ - - - - ℥xiii. M.

Capiat cochlearium parvum secundâ quâque horâ.

4th.—Whoops less; coughs not quite so often; but the medicine has not been given more than once in three hours, because the mother thought it purged too much.

Repetatur mistura tertiâ quâque horâ.

6th.—Cough much less—not more than twice in the night; the paroxysms lasted three or four minutes this morning; has not hooped at all since the day before yesterday; pulse 175; skin not hot; much mucous râle; respiration loud—45; lips and nose a little swelled.

℞ Pulv. ipecacuanhæ - - gr.v
Antimonii tartarizati - gr.i. M.

Fiat pulvis, statim sumendus. Repetatur mistura.

8th.—The emetic acted well; pulse 90; skin cool; respiration easy and natural; cough nearly gone; no whoop.

Perstet.

10th.—Free from cough; no whoop.

The child had no relapse.

CASE X.

Master O., aged four months and a half, a healthy-looking child, residing in St. Paul's Church-Yard, was attacked with hooping-cough about the middle of October 1837, which gradually got worse until the 28th of November, when I visited him, with Mr. Burn, of Earl Street, Blackfriars. His respiration was easy and health good, but the cough was frequent and troublesome. We prescribed,

℞ Acidi hydro-cyanici (Scheele's) ♏xiv
Syrupi croci - - - - - - - ʒi
Aquæ destillatæ - - - - ʒxv.

One teaspoonful every third or fourth hour.

The cough became gradually better, and the whoop less frequent; but on the 27th December the child appeared so languid, and the cough so frequent and teazing, and at the same time feeble, that the medicine was discontinued and the following mixture was given:—

℞ Liquoris opii sedativi - ♏xvi
Ammoniæ carb. - - - gr.xvi
Infus. aurant. comp. - - ℥ii. M.
Capiat cochlearium parvum ter die, vel quartis horis.

January 5th.—Cough much less; whoop seldom heard; child appears stronger. A little paregoric elixir and ipecacuanha wine were continued till the end of January, when the child was quite well.

In February he caught cold, and had a return of the hooping-cough, but was cured in a few days by the hydro-cyanic acid.

His two sisters, aged three, and five years, were at the same time affected with hooping-cough; they took the same medicine and recovered in a short time, but notes were not taken of their cases.

CASE XI.

August 17th, 1837.—Mary Lush, aged eighteen months, residing in Charles Street, Hampstead Road, an exceedingly pallid, bloodless-looking child, had been suffering from hooping-cough since the 3rd of June last. Her mother said she had never been well since she was three months old, and that she then became subject to frequent attacks of fainting, although she did not appear to have any particular complaint. By the use of some medicines she recovered from this state. At the age of four months she cut

two teeth, and again became affected with fainting as she had been before. By means of medical treatment she gradually improved in strength, and walked very well at twelve months. About this time she was weaned, without, however, declining in flesh; but soon after this period she lost the power of walking, and used to sit on the floor for several hours, taking no notice of anything. Once or twice a day she would suddenly change colour and become deadly pale, especially her lips. After a few days she recovered, and remained well for a similar period, when the attack again returned. She continued subject to these seizures till about May last, from which time she became unable to bear the attitude of sitting. If placed in that position her cheeks grew pale and her lips white, and she threw herself back and remained motionless, her eyes being open but looking very dull. This state lasted for a week, when she took medicine by the advice of Mr. ——, and partially recovered. In about three weeks afterwards she relapsed into the same condition, and has continued so ever since. Late in the month of May a cough came on which was accompanied by a whoop. On the 3rd of June she brought up a great deal of phlegm, but her breathing was not at all affected.

The present appearance of the child is remarkable; she is stout, but of the peculiar sallow colour which is characteristic of anæmia; whilst sitting upright in her mother's arms, she becomes pallid, the eye grows languid, she loses all pulse, and faints away; but she recovers on being laid down flat. This happens very frequently during the day if she is removed from the horizontal position. Her appetite is good; bowels open; pulse very feeble—90; respiration natural; skin cool; the cough is troublesome,

but not violent; the whoop is very distinct; respiratory murmur is audible over every part of the chest, with slight mucous râle. She has been fed on bread and milk twice a day; and broth, or beef-tea for dinner. She sleeps badly.

℞ Acidi hydro-cyanici (Scheele's) ♏xii
Vini ipecacuanhæ - - - - ʒiss
Syrupi papav. - - - - - ʒviss
Ammoniæ carb. - - - - - ʒss
Misturæ camphoræ - - - ʒi. M.

Fiat mistura. Capiat cochlearium parvum tertiâ quâque horâ.
Meat for dinner; milk and lime-water 3oz. night and morning.

19th.—Breathing hurried and difficult—40 in a minute; loud mucous râles heard all over the chest; pulse 100, feeble.

℞ Pulv. ipecacuanhæ - - gr.v
Antimonii tartarizati - gr.i. M.

Fiat pulvis, statim sumendus.
Repetatur mistura. Capiat vini ferri ʒii ter die.

21st.—Breathing easy; wheezing all gone; pulse 90; child looks better; still faints frequently if placed in a sitting posture.

Perstet.

23rd.—Skin hot; pulse 90; child seems feverish; thirsty.

Omittatur vinum ferri. Repetatur mistura.

31st.—Cough much better; only three paroxysms last night; but child still faints on sitting up.

Capiat vini ferri ʒii ter die. Repetatur mistura.

September 5th.—Cough worse; child faints very frequently in the day; pulse 80; excessive sickness; skin cold.

Capiat ferri carbonatis ℈i ter die. Repetatur mistura.

12th.—Faintings not quite so frequent; pulse still very feeble; cough better.

Perstet.

19th.—Cough and whoop much less frequent; the faintings continue very little amended.

℞ Ferri sulphatis - - - ℈ii
Quininæ sulph. - - - ℈i
Acidi. sulph. dil. - - ʒss
Liquoris opii sedativi - ♏x
Aquæ - - - - - - ʒii. M.
Fiat mistura. Capiat cochlearium parvum ter die.

26th.—Faintness all gone; child much improved in appearance; pulse still feeble; cough better.

Perstet.

October 12th.—The colour of the skin no longer white; no fainting since the last report; cough and whoop much better—not more than four or five slight paroxysms in twenty-four hours; bowels purged.

℞ Ferri sulphatis - - - - - ℈ii
Acidi hydro-cyanici (Scheele's) ♏xvi
Aquæ - - - - - - - - ʒii
Liquoris opii sedativi - - - ♏viii M.
Fiat mistura. Capiat cochlearium parvum ter die.

After this the child continued gradually to improve in health and strength. The whoop ceased about the 20th of October, and the child was dismissed cured of both anæmia and cough on the 16th November, having continued the prescription of iron and hydro-cyanic acid all the time. She is now perfectly well, and a healthy-looking child.

CASE XII.

Sunday, March 4th, 1838.—I was requested to visit the children of Mrs. D., residing in Gordon Square, who were suffering from hooping-cough.

Master George D., aged four years, a fine healthy-looking boy, had had the cough violently for a few days. His face was a little swollen, particularly the nose and lips; respiration 40; pulse 100, pretty sharp; skin rather hot; cough frequent; whoop loud and distinct; on applying the ear to the chest, the respiratory murmur was very audible everywhere, with slight mucous râles; appetite not good; bowels confined.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - - ʒi
Aquæ destillatæ - - - - - - ʒii. M.

Fiat mistura. Capiat cochlearium parvum 3tiâ quâque horâ.
To be given in some warm liquid. Low diet; warm room.

8th.—Respiration easy and natural; all swelling of the face gone; pulse 80; skin cool; seems perfectly well in health; coughs less frequently, and scarcely whoops at all.

Perstet.

11th.—Perfectly free from cough and whoop.

To continue the medicine for another week.

Miss Fanny, aged nine,
Miss Eliza, aged seven,
Miss Ellen, aged five and a half,
Miss Catharine, aged three,
Miss Mary Anne, aged one and a half,—

were all affected with the same complaint a few days after their brother began to hoop. They took the same medicine, and were all cured in less than fourteen days, excepting Miss Ellen, who would not take the medicine regularly; but in less than three weeks she also was well.

CASE XIII.

Louisa Gérard, aged four months, a thin, delicate-looking child, residing in Fitzroy Place, Fitzroy Square, was brought to me on the 14th March 1838, suffering from a frequent cough which came on in paroxysms.

Some children living in the same house with her were then labouring under hooping-cough. The respiration was natural; skin cool; general health not affected; she took the breast readily. As she had not yet hooped, I prescribed—

℞ Vini ipecacuanhæ - - ʒi
Extract. conii - - - - - ϑi
Misturæ camphoræ - - ʒii. M.
Fiat mistura. Capiat cochlearium parvum quartis horis.
The child to be kept warm.

21st.—Cough not better; skin rather hotter than natural; the child hoops a great deal.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Aquæ destillatæ - - - - - ʒii. M.
Fiat mistura. Capiat cochlearium parvum tertiâ quâque horâ.

25th.—The whoop seldom heard; paroxysms much less frequent; cough still continues, but the feverishness is gone.

28th.—Coughs very seldom; sleeps well; whoop cured.

April 4th.—Perfectly well; does not cough at all.

The medicine was then omitted, and no relapse had occurred on the 28th of April.

The following cases were communicated to me by my friend the late Mr. Jones, of Manchester Street, to whom I had made known the good effects produced by the exhibition of hydro-cyanic acid in hooping-cough.

May 1831.—Miss Emily M., aged seven years, residing

at Tiverton in Devonshire, an only child, was attacked with this complaint a few days after her sister had fallen a victim to it. Her paroxysms of coughing were more violent than those of her sister; her breathing was oppressed, and her head somewhat affected: in the intervals she was languid and feverish; she slept little at night; her appetite was bad, and her bowels confined. One minim of hydro-cyanic acid was given her by Mr. Jones every four hours, with farinaceous food. The whoop was only heard twice after its exhibition. In a fortnight the cough was gone, and her general health and strength materially improved.

Miss Emily E., aged three years, residing in Hans Place, Sloane Street, was attacked with hooping-cough in January 1834, and was attended by Mr. Jones. The symptoms were of a mild kind. After taking the hydro-cyanic acid she hooped twice only. The dose given her was three-fourths of a minim every four hours. Her sister had had this complaint the previous year; it was nine months before she recovered from it, and then her constitution was injured, and her health continued very delicate for a long time.

A family at Brighton, whose child was suffering from hooping-cough, heard of the rapidity with which the last-mentioned child had been cured, and requested their medical attendant, Mr. Dill of Regency Square, to write to Mr. Jones, and inquire what medicine he had given. He did so; and, agreeably to the directions he received, administered hydro-cyanic acid. The following description of the effects it produced is copied from a letter of his to Mrs. Jones.

"A child of Major H., aged four months, commenced taking hydro-cyanic acid on the 4th of July, ten days after the accession of hooping-cough. During this short time he

had had two severe attacks of convulsions. After the first dose the child was manifestly better; in three days the whoop had altogether ceased, and there was no return of the convulsions. The change was so remarkable that the parents of the child could not for several days be persuaded that it would be permanent, but the recovery was rapid and perfect."

However questionable the prudence may be of non-medical persons who administer so powerful a medicine upon their own judgment, to poor children whose parents cannot afford to pay for medical advice, their testimony will be received as a satisfactory confirmation of the report already given of the power which hydro-cyanic acid possesses of arresting the progress of this dangerous complaint. I cannot therefore withhold the cases of hooping-cough with which they have furnished me.

Mrs. Marsh, a lady residing at the Armoury Mills, Lewisham, had had for some years past about forty girls under her superintendence, who were employed in a silk manufactory. Their parents were in the habit of taking their other children to her, whenever they became affected with illness of any kind, and thus an opportunity was afforded her of treating hooping-cough in cases where there was no possibility of obtaining medical aid.

The most striking cases she met with were three children whom she met accidentally last summer walking in Greenwich Park. They were running up the hill coughing and hooping violently, and their whole appearance shewed that they had suffered severely from the complaint. Compassion for the children, and a desire to cure them, induced her to address their mother, and inquire how long they had had hooping-cough. The lady answered, "several months;

that they had taken a great deal of medicine, without the slightest benefit; and that she had brought them to Greenwich in the hope that change of air might do them good." Mrs. Marsh proposed to give them a medicine with which she had cured a great many children; the lady accepted her offer. The hydro-cyanic acid mixture was prepared, and regularly administered in doses of three-fourths of a minim every fourth hour. Two eight-ounce bottles were consumed by the three children, each tea-spoonful containing a dose; and before they were finished the children were perfectly well.

The other cases cured by Mrs. Marsh with hydro-cyanic acid are given below.

Date.	Name.	Age.	Residence.	Medicine.	Duration of illness.
1834, Jan.	John Jacob	3 years	Deptford	Acidi hydro-cyanici mĵ Vini antimonii m10, 4tis horis	7 days.
—	William Jacob	1 year	ditto	ditto	7 days.
1835, May	H. Greenaway	6 years	Greenwich	Acidi hydro-cyanici mĵ, 4tis horis	10 days.
—	W. Greenaway	10 months	ditto	ditto	7 days.
1836, Feb.	Mary Jacob	4 years	Deptford	Acidi hydro-cyanici mĵ Vini antimonii gutt. x, 4tis horis	14 days.
1837, June	M. Pegler	11 months	Southampton	Acidi hydro-cyanici mĵ Vini ipecacuanhæ mv, 4tis horis	21 days.
1838, Feb.	Jas. Meekum	3 months	Lewisham	Acidi hydro-cyanici mĵ, 4tis horis	21 days.
—	John Meekum	6 months	ditto	ditto	7 days.
1838, Feb.	Mary Ferguson	10 years	Blackheath	Acidi hydro-cyanici mĵ, 4tis horis	14 days.
—	J. Ferguson	8 years	ditto	ditto	16 days.
—	— Ferguson	6 years	ditto	ditto	20 days.

After the perusal of these cases, the power of hydro-cyanic acid in arresting the progress of simple hooping-cough can scarcely be doubted. Its first effect is to abate the violence and shorten the duration of the paroxysm; then to stop the whoop.

Two cases only of death from what appeared to be simple hooping-cough have occurred in my practice, since I began to treat this disease with hydro-cyanic acid;—one, Maria Jones, p. 19, the other Master H. B., Case II. in this chapter. In the former case a post-mortem examination shewed that inflammation had existed, although I do not think the appearances were sufficient to account for death. In the latter case the child evidently died from difficulty of breathing. I feel strongly inclined to think that inflammation of the lungs must have insidiously supervened, and caused death. He was a strong healthy child of eight months old, and the acid he took was limited to three quarters of a minim every fourth hour. This dose could not have caused too great depression, for children of four months old have taken the same, and several infants are now taking this quantity every second hour. But in addition to this fact, it is to be observed, that the medicine had been left off forty-eight hours before the child's death, and he appeared by no means weak, though breathing quickly, the very morning of the day he died. Depression certainly did not cause his death. The wheezing which is indicative of bronchial inflammation was not so great as to attract notice. I cannot, therefore, suppose any other cause of death than inflammation of the substance of the lungs, which in infants is insidious and rapid in its progress. I remember once seeing a child running across the room on a Sunday, apparently in perfect health, and on the Tuesday following the child was dead of inflammation of the substance of the lungs. I have had much reason to regret on many accounts,—for the sake of science, and of my own feelings,—that an examination was not made of the body of Master H. B.

The case of Mary Lush was a curious one—the only striking instance of anæmia I ever saw in a child. She has fainted more than once during the short time I was inquiring of the mother how she was going on; and this occurred on several days. I was at first at a loss to know how to treat the child, being afraid on the one hand that iron would increase the cough, and sure on the other, that hydro-cyanic acid would increase the debility caused by anæmia. This, however, being the most urgently pressing condition, I gave iron, using at the same time the acid with great caution.

The efficacy of hydro-cyanic acid seems to be greater when administered soon after the commencement of the complaint, than when it is at its height. The duration of the disease, when treated with it, seems to vary from five days to two months; but the greater number are cured in fourteen days. Mary Lush was not cured for three months, but it was a very unusual case, and scarcely affects the question. The dose of good acid for the youngest child is not less than three-fourths of a minim; the largest dose for the oldest child does not exceed one minim, unless fever be present, and in such cases the medicine will be useless unless it is given in sufficiently large doses, and repeated often enough to lower the pulse and to diminish the heat of the skin.

The cases in which it *fails* to cure appear to be those where the system is too weak to bear its depressing effect; but amongst the whole number, it is to be observed, one child only, (Case VIII., Master W. S.) and that one of extraordinary delicacy, was unable to persevere in taking it. The circumstances under which it *ceases* to operate beneficially in the cough are, when inflammation has taken

place, and when the depression is already great; the further use of it will, in all such instances, be injurious. This observation applies equally to all remedies of a depressing character; for in common coughs, and even in inflammation, if the pulse be weak and the *vis vitæ* below par, the use of digitalis and such medicines will increase the mischief. Antimonial, and ipecacuanha wine, are useful principally when any catarrhal symptoms are present; but the acid alone is sufficient to cure the complaint. Emetics, when mucus blocks up the air passages, relieve difficulty of breathing; but the acid should not be suspended because they are administered.

Opium, it will be observed, in combination, often proves useful when the cough is hard and dry; and the use of hydro-cyanic acid should not prevent us from also employing other medicines, when such symptoms arise as indicate their exhibition.

CHAPTER IX.

COMPLICATION OF BRONCHITIS WITH HOOPING-COUGH.

Hooping-cough and bronchitis may commence together—Symptoms of the complication—Cessation of the whoop—Danger of this form of disease—Morbid appearances—Explanation of the symptoms therefrom—Indication of treatment—Bleeding from the arm—Liable to abuse—May often be superseded by sedatives—Their mode of action—Plethoric persons require bleeding—This complication frequent in "fine children"—Such should be bled early in the disease; from the arm when practicable—Leeches not to be relied upon—Some sedatives preferable to others in inflammation of certain tissues—Digitalis, colchicum, ipecacuanha, tartar-emetic, antimony. Their effects subside; must be kept up by repetition—Care and watchfulness required in the use of them—Their peculiar value—Hydro-cyanic acid should also be administered—Occasional depression of the nervous system; treatment—General directions—Cases—Reflections thereon.

Hooping-cough and bronchitis sometimes commence together with rigors and the other febrile symptoms which generally usher in an attack of acute inflammation of the bronchial tubes. A sensation of chilliness, as of water trickling down the back, is followed by increased heat of

the skin; flushing of the face; fulness and quickness of the pulse; a watery discharge from the eyes and nose; hoarseness of the voice; oppression of the breathing, with pain under the sternum; dry cough; foulness of the tongue; costiveness of the bowels; loss of appetite; great thirst; and occasionally head-ache. In a few days the febrile symptoms abate a little; expectoration of frothy mucus commences; the face swells and assumes a bluish hue; the lips become thick and dark-coloured; the breathing is accompanied with loud wheezing; the cough is more frequent and comes on in paroxysms, assuming the character of hooping-cough, though the whoop may be absent. The matter expectorated increases in quantity, and becomes muco-purulent. At the end of a week or ten days the whoop is heard, and the paroxysms recur at short intervals.

When the paroxysm is over, the patient does not, as in simple hooping-cough, feel as if nothing were the matter. The breathing remains oppressed, the pulse quick and full, and the skin hotter than natural; the appetite is bad; and there is a great disinclination to using any exertion. When the chest is examined, it is observed not to dilate properly; its motions are short, and more rapid than usual, and the sound elicited on percussing it is clear; the respiratory murmur is audible in the greater part of the lungs, accompanied by loud sonorous râles; in some parts it is absent or suspended at one period, whilst at another, when the obstructing mucus is removed, it is again heard.

The custom of leaving the neck and arms of children uncovered, which is at all times injudicious in a climate so cold and variable as ours, is particularly so whilst they are suffering under an attack of hooping-cough. The influence of cold air upon delicate children at such a time very frequently

gives rise to inflammation of the mucous membrane of the bronchial tubes. The exposed parts of the body become chilled; the natural perspiration is checked; and the blood is determined to the internal organs, especially the part which is already the subject of irritation; congestion of the vessels of the air tubes therefore ensues, and produces difficult and rapid respiration, attended with loud wheezing, and expectoration of viscid mucus, which is sometimes so difficult of expulsion that children put their hand down their throat to excite vomiting: unless remedial measures are then speedily adopted, the train of symptoms which have just been described will follow.

As the disease advances the paroxysms become more frequent and violent, returning, in bad cases, every quarter of an hour. During the continuance of such a paroxysm the patient looks as if he were being suffocated; the veins of the neck are turgid, the face and ears are livid, and the matter expectorated is purulent and frothy. Should the disease become still more severe, the hooping sound is no longer heard, and the paroxysm ends without any expectoration; leaving the patient fatigued, breathing with difficulty, and in a state of stupor, or complete exhaustion. During the intervals he remains languid, oppressed, and drowsy; his flesh and strength decline rapidly; his pulse becomes weak, occasionally quick, and often irregular; the breathing much more oppressed; and the skin of the body assumes a livid hue, and is covered with a cold perspiration; the respirations are rapid—sometimes 60 in a minute; the alæ of the nose are in constant action; the chest seems now almost motionless; a full inspiration can no longer be drawn, and when attempted, little effect is produced in expanding the thorax; and the râle arising from the collection of mucus in the

bronchial tubes can be heard at some distance from the patient. Under this load of distressing symptoms, the patient lives but a short time; his debilitated state prevents him from expectorating the mucus, which therefore accumulates in the bronchial tubes; and at length worn out by exhaustion, as well as by difficulty of breathing, he expires without a struggle.

This dangerous condition is well described by Dr. Badham in his Essay on Acute Bronchitis. He says, "If the disease remain for a few days unsubdued by proper treatment, or have hitherto been neglected, all the marks of excessive action disappear; the pulse is no longer full or hard; it becomes excessively feeble, and of almost countless frequency; partial sweats break out at intervals; the patient spits up an immense quantity of yellow sputa, till from feebleness he can expectorate no longer, and then the secretion accumulates in the bronchiæ till he dies. The last hours in some cases exhibit the *luctus cum morbo* in a frightful degree of violence, and the patient often becomes delirious before he sinks under it."

The morbid appearances perceived upon making a post-mortem examination of such patients are the following:— On opening the chest, the lungs do not perfectly collapse, and, when cut into, they are found to contain a good deal of dark-coloured blood, which renders them much more solid than natural. The bronchial tubes are found filled with purulent and frothy matter, and the mucous membrane appears of a reddish colour, no longer white, smooth and shining, but giving the feeling of velvet to the touch.

These alterations of structure fully explain the symptoms which are observed during the course of this disease. At its commencement there is no expectoration, because the

secretion of the mucous membrane is stopped by the first stage of inflammation. When the secretion does take place, its quality is found changed into a mixture of mucus and pus. This accumulates during the intervals of the paroxysms, and, so long as the patient's strength remains, is easily expelled by coughing; but when that excessive feebleness comes on which marks the later stages, the power of expectorating is lost, and an accumulation of matter therefore takes place in the bronchiæ and trachea; this accumulation—the injected state of the membrane which opposes the free passage of air into the lungs—and the consequent interruption of the decarbonization of the blood,—all combine to produce the difficulty of breathing, suffocation, and death. The distension of the air cells with pus prevents the lungs from collapsing when the chest is opened; and the lividity of the countenance is owing to the non-oxygenization of the blood.

The indications are, obviously, to subdue as speedily as possible the inflammation of the mucous membrane of the trachea and bronchiæ, as being the source from whence danger is to be apprehended; and also to allay the cough.

The phenomena of inflammation which require to be known in order that it may be successfully treated, are, that in the part affected and its immediate vicinity the circulation is either altogether suspended or materially retarded, and the capillary vessels much dilated,—that at a little distance from the point of inflammation the circulation is accelerated, and the vessels are enlarged to such an extent that a much greater quantity of blood is carried through them, than through the corresponding vessels of the opposite side;—and that this state of the circulation, and of the vessels, is caused by the *vis à tergo* or increased force with

which the heart propels its blood. The cure of inflammation must therefore be attempted by emptying the dilated vessels of a portion of their contents, and by enfeebling the action of the heart so as to prevent it from again distending them. Bleeding to faintness effects, for a time, both these objects; and could that state of the heart which is induced thereby be kept up for a sufficient period, the vessels would contract themselves to their original calibre. But in a short time after blood has been abstracted, reaction will take place; the heart will beat with the same, or perhaps even greater violence, and the affected part will become swollen, and of a vivid red colour, shewing that the vessels have again become distended. If another bleeding be resorted to, the same beneficial effects ensue, but similar ill consequences follow; and thus symptoms of inflammation go on alternating with faintness, until the strength of the patient becomes so much reduced by loss of blood, that reaction is no longer possible. The inflammation may then have been cured, but at an expense to the system of perhaps some pints of blood; and many months must elapse before the patient's strength can be restored, or that blood which he has lost be renewed.

In inflammation of the conjunctiva we have an opportunity of observing the distended state of the vessels, and the effect which bleeding produces upon them. The white of the eye is covered with numerous large red vessels, which cannot be seen when that organ is in a healthy condition. If the patient be bled to faintness, the greater part of the red vessels will disappear, and will not reappear so long as the heart continues to act feebly. The indication therefore is, to keep the heart in that state of enfeebled action which the abstraction of blood has induced. This

may often be done as effectually by the administration, *after one bleeding*, of sedative remedies,—such as colchicum, digitalis, hydro-cyanic acid, and tartar-emetic,—as by *frequent* bleeding. Soon after the exhibition of these medicines, the frequency of the pulse is decreased several beats in a minute, and its force is considerably weakened. These effects, however, continue only a short time. The dose must therefore be repeated when their influence begins to subside, which generally takes place in about three or four hours. If this be done, every successive dose will more and more diminish the heart's action, until it is reduced below the standard of health. The *vis à tergo* being thus subdued, the distended vessels become gradually relieved of their contents, and contract to their original calibre. By this plan of treatment, the necessity for *frequent* bleeding is in most cases obviated.

When, however, inflammation attacks persons of a plethoric habit, whose veins are overcharged with blood, sedative remedies will have little or no effect upon the heart, because there is in circulation a quantity of blood inconsistent with the healthy performance of the various functions of the body. When febrile action takes place in such persons the heart labours to propel its contents, but the free passage of the blood is obstructed by the quantity with which the vessels are loaded. These cases require the abstraction of blood even twice or oftener until the excess is removed, and the quantity in circulation is reduced to the healthy standard of the individual.

The complication of bronchitis with hooping-cough, when they appear together, generally occurs in plethoric children, in whom venous congestion is in itself a disease. It will therefore be prudent to bleed them in the very com-

mencement of the attack, in order to prepare them against its violence. An ounce and a half or two ounces may be taken from children of a year old; three or four ounces may be taken from children of three years of age; and eight or ten ounces from children of ten years of age; always remembering that the object is not to produce fainting, but to unload the vessels of the lungs without weakening the child. Should the bleeding not be resorted to as a measure of precaution, but deferred until the difficulty of breathing renders it indispensable to the preservation of life, it will require to be repeated until the oppression of the breathing is relieved.

Bleeding from the arm is by far the most efficacious mode of abstracting blood. The patient should be placed in a horizontal position, and the blood should be taken from a small orifice, and stopped as soon as the first symptom of fainting is manifested. When the oppression of the breathing is great, leeches are not to be depended upon; they draw blood so slowly that a considerable quantity must be taken before any impression is made upon the heart. Moreover, the quantity they abstract is uncertain; sometimes they take so little that the disease is not at all checked by their application; at other times they take so large a quantity that the child's life is endangered by the debility which loss of blood has produced. The leech-bites also frequently bleed for hours after the leeches have been removed, and children die before their attendants can stop the bleeding.

In this form of the complaint, venæsection should be employed in all cases excepting when the veins of the arm are too small to be opened by a lancet, which sometimes happens in very young children, though much more rarely than is generally supposed.

As soon as the heart's action has been quieted, and the difficulty of breathing relieved, by the abstraction of blood, some sedative remedies should be immediately administered. But though all medicines of this class operate directly upon the heart, all are not equally appropriate for the cure of inflammation of a particular organ. One appears more useful in affections of the lungs; another seems to exert a greater influence over inflammation of the brain; and a third is found more successful in affections of the serous membrane.

For inflammation of the bronchial membranes, digitalis appears to be the most effectual remedy. Its power may be increased by combining it with calomel and squills; one grain of calomel, two grains of squills, and half a grain of digitalis may be given every fourth hour to children under two years of age; and to older children, the same dose of calomel and squills with one grain of digitalis may be given as frequently; but as digitalis, from its quality of accumulating in the system, is the most dangerous of all remedies, extreme care and watchfulness are required in the use of it. The moment the strength of the pulse is reduced, or any intermission takes place, it should be discontinued. As a general rule, its exhibition for more than three successive days is unsafe. Colchicum with ipecacuanha ranks second in the treatment of this form of the complaint. Two grains of the former with one of the latter may be given to children under three years of age, and three grains of colchicum with a grain and a half of ipecacuanha to those who are older, every fourth hour until the breathing is relieved, or till the pulse is reduced; but if sickness should be occasioned, the quantity of ipecacuanha must be lessened, as frequent vomiting

by no means promotes the cure of these affections. Tartar-emetic is a favourite remedy in bronchitis; but the distressing sickness which it occasions renders it less desirable than other remedies of this class. Five drops of antimonial wine given every hour, or less frequently if the symptoms are not urgent, will often subdue the inflammation.

For infants, at the commencement of the disease and before the lungs have become organically affected, ipecacuanha wine is sufficient; four drops may be given every hour till the child breathes freely; but it should be intermitted immediately upon his appearing lowered, otherwise, in weakly children, it may produce a degree of depression which is exceedingly dangerous.

By the use of these remedies the breathing becomes less difficult; the skin cooler; pulse softer; expectoration more copious; the countenance is relieved of its expression of distress; and a gradual improvement in all the symptoms may continue till the cure is completed. But in administering these medicines it should be carefully borne in mind that they possess great power of doing harm as well as good; and the necessity of using them arises from the presence of a disease which, if left to itself, must certainly prove fatal.

The object in view is to reduce the febrile symptoms, and to control the action of the heart. This may be done with less expense to the constitution by sedative medicine than by bleeding. But the dose must be sufficient to work a decided effect upon the system; and that effect must be kept up by repeating the dose at certain intervals, depending as to their duration upon the individual case. So long as the power of reaction continues, sedative remedies can

do no harm; but the moment this ceases and debility takes place the further exhibition of them cannot fail to be injurious. Their effects, and the progress of the symptoms, must therefore be carefully watched by the practitioner who is desirous of saving his patient; but he will be amply rewarded for his trouble and anxiety by seeing cases recover which no other plan of treatment would cure.

When this affection of the bronchial membrane is not very severe, the cough continues but little abated in its violence, and therefore, in addition to the sedative remedies, hydro-cyanic acid should be administered in the same doses as are recommended for the treatment of simple hooping-cough. Should the breathing become difficult from a collection of mucus in the bronchiæ, as described in the directions for treating the disease in its simple form, or if the wheezing be very great, an emetic may be given—five grains of ipecacuanha with one of tartar-emetic; and a blister may be applied to the chest with good effect. Emetics, though they do not, in my opinion, tend to cure the complaint, are very useful to throw off the accumulation of mucus which oppresses the lungs, and affects the breathing; but as the use of them is merely to remove these symptoms, they should not be repeated till the symptoms recur; and of course no stated periods can be laid down for their exhibition.

It not unfrequently happens, that, after the inflammatory symptoms have been relieved, the nervous system appears to be unduly depressed, and the bronchial secretion inconveniently increased. Râles are heard in every part of the chest; the expression of the eye and countenance indicates languor and debility; the pulse is feeble, and the patient is unable to free his lungs from the secre-

tion which oppresses them. Under such circumstances the sedative medicines, and the hydro-cyanic acid also, must be discontinued, and gently-stimulating remedies, such as ammonia, with ether and opium, in small quantities, should be administered until these symptoms are removed, the secretion is diminished, and the power of expectoration increased.

At the same time that medicines are administered, other remedial means should not be neglected. The patient should remain in bed; the room should be kept warm—at a temperature of about 65; warm bathing should occasionally be used; the food ought to be purely farinaceous, and given warm, at first in a fluid state; afterwards, when the inflammatory symptoms have subsided, in the form of puddings &c. :—but for more particular directions on these points we must refer to the chapter on general treatment.

A steady perseverance in these measures will generally effect a cure in about a month. Change of air will then be useful; not, as it is commonly supposed, to remove the complaint, but, that end having been attained by other means, to invigorate the enfeebled constitution, and restore the functions to that natural energy and activity of which suffering, and reducing remedies, have deprived them.

Of the numerous instances of this complication which I have seen, I annex a few of the most interesting.

CASE I.

On the 11th of January 1830, I visited Master B. M., aged one year and a half, the brother of Master H. M., whose case is given in page 96. He was a short-necked

child, of full habit. His face was swollen; lips blue; alæ of the nose in constant motion; respirations frequent—40 in a minute; chest little dilated by an inspiration; pulse 120, full; countenance indicating much distress; he coughed and hooped very frequently, and expectorated a good deal of viscid muco-purulent matter. The respiratory murmur could be heard over every part of the chest, but it was accompanied with loud wheezing and sonorous râles;—skin hot; bowels confined, and appetite bad. As the inflammation of the bronchial membrane was the principal source of danger, and required prompt attention, six leeches were applied to the chest, and the following medicine was prescribed:—

℞ Pulv. digitalis - - - - - gr.viii
Pulv. scillæ - - - - - - - ʒi. M.
Fiant pulveres decem. Capiat unam quartâ quâque horâ.

℞ Acidi hydro-cyanici (Scheele's) ♏xii
Vini ipecacuanhæ - - - - ʒss
Aquæ destillatæ - - - - ʒiv. M.
Fiat mistura. Cujus capiat cochlearium medium secundâ quâque horâ.

℞ Pulveris scammoneæ - - - gr.iv
Hydrargyr. submuriatis - - gr.ii. M.
Fiat pulvis, statim sumendus.
Three ounces of arrow-root or prepared barley once in four hours.

12th.—Breathing much relieved; face less swollen; lips less blue; pulse 110, less full, but still with too much force; cough and whoop very violent; much wheezing.

Repetantur remedia.

13th.—Respiration nearly natural; pulse 100; face scarcely at all swollen; cough and whoop very frequent; paroxysms shorter; wheezing less.

Omittantur pulveres. Repetatur mistura.

14th.—Breathing natural; pulse 80; countenance tranquil; wheezing almost gone; cough better.

Perstet.

15th.—Cough very much better; whoop ceased; paroxysms very short; the child now plays about and amuses himself.

Perstet.

He seemed so much better that I did not visit him again until the 18th, when his cough was gone, and he appeared perfectly well. As a matter of precaution, the medicine was continued a few days longer. The cough did not return, and no relapse took place.

CASE II.

18th April 1834.—Miss Ellen E., aged five years, residing in Cambridge Terrace, had an attack of measles in December last, from which she had scarcely recovered when, with her brothers and sisters whose cases are reported at pp. 102-4, she was seized with hooping-cough. She was treated with the usual remedies, but without any marked relief; my attendance was therefore requested. She was a short-necked, stout child; her face was rather swelled; respirations 30 in a minute, with much wheezing; pulse 100; cough and whoop very violent; bowels open; tongue clean; appetite good. She used to play about with the other children, and appeared not to suffer much. Her difficulty of breathing, as compared with that of her brothers and sisters, was attributed to asthma, with which she was supposed to be afflicted.

℞ Acidi hydro-cyanici (Scheele's) ♏xii
Vini ipecacuanhæ - - - - ʒiss
Misturæ camphoræ - - - - ʒxivss. M.

Fiat mistura. Capiat cochlearium parvum quartis horis.

Three ounces of barley-gruel every fourth hour. To remain in a warm room.

19th.—Much the same as yesterday.

Perstet.

20th.—Cough not better; expectorates a good deal of viscid mucus; sleeps badly at night, being frequently disturbed by the cough; breathing not worse.

Repetatur mistura secundâ quâque horâ.

21st.—Cough less frequent and violent; slept rather better last night.

Perstet.

22nd.—Breathing much oppressed; respirations 40, with loud wheezing; pulse 140; skin rather warm; countenance much distressed; cough worse.

℞ Pulv. ipecacuanhæ - - gr.v
Antimonii tartarizati - gr.i. M.

Fiat pulvis, statim sumendus. Repetatur mistura.

23rd.—Breathing easy; wheezing much less; pulse 100; countenance relieved of the anxious expression; cough much less frequent since the action of the emetic.

Perstet.

24th.—Paroxysms shorter; cough and whoop less violent; breathing easy; looks much better.

Perstet.

From this date the child seemed to go on so well that I did not visit her daily. On the 27th I called to inquire after all the children, and was told this little girl was going on well—that she had coughed very little that day. She was standing in the window. I called her to me, and to my surprise perceived that the breathing was very short and rapid, the chest scarcely at all dilating during an inspiration; face swollen; eyes suffused; pulse 120; skin somewhat hotter than natural. On applying the ear to the chest the air was perceived to pass a very short way into

the lungs, and loud sonorous râles were heard all over the chest. All this time she had made no complaint. It was now evident that the child was labouring under an acute bronchial affection, and was in great danger.

I bled her from the arm to about three ounces, and prescribed the following medicine:—

℞ Pulv. digitalis - - - gr.i
Pulv. scillæ - - - gr.ii. M.

Fiat pulvis, quartis horis sumendus. Repetatur mistura acidi hydrocyanici.

28th.—Breathing deeper and less rapid; chest more dilated by an inspiration; respiration 35 in a minute, accompanied with loud wheezing; pulse 140, less full; no whoop; cough frequent, but short.

Applicetur emplastrum cantharidis sterno. Repetatur mistura acidi hydro-cyanici. Omittatur pulvis digitalis.

29th.—Respirations still rapid—30 in a minute; much wheezing heard all over the chest; alæ of the nose dilating rapidly; pulse 140, scarcely strong enough to bear bleeding from the arm; cough short, with very little expectoration.

Applicentur hirudines octo thoraci. Repetatur mistura.

I requested that the child might be watched, and when she appeared low or faint, that the leeches should be taken off, and the bleeding stopped by applying peas to their bites, if necessary. This was done: it was supposed the bleeding had quite ceased, and a cloth was laid over the chest; but the bleeding began again without being suspected, and the child became so deadly pale that alarm was felt, and I was sent for. I found a stream of blood had been flowing down under the cloth, and had run through

much of the bed-clothes. The bleeding was soon checked, but the child was cold, and so nearly gone, that I was obliged to give her port wine and brandy in tea-spoonfuls until the pulse returned, and the heat was restored.

All medicine was omitted till next morning.

30th. — Pulse 180, feeble; skin hotter than natural; tongue foul; bowels confined; thirst troublesome; very little cough.

℞ Sodæ carbonatis - - - - - - ʒi
Acidi hydro-cyanici (Scheele's) ♏xvi
Aquæ - - - - - - - - - - ʒii. M.

Fiat mistura. Capiat cochlearium parvum quartâ quâque horâ.

Olei ricini ʒii statim.

May 1st.—Still very feverish; skin hot; pulse 180; tongue foul; bowels opened twice by the castor oil; cough short; takes a fuller inspiration; no whoop.

Repetatur mistura.

℞ Hydrargyr. submuriatis - gr.ii
Pulv. scammoneæ - - gr.iv. M.

Fiat pulvis, statim, et manè quotidie sumendus.

The child remained in this state, with very little variation of her symptoms, free from cough, but feverish and very restless at night, until the 6th, when the skin became burning hot; face flushed; eyes suffused; pulse 150, sharp but not full; bowels freely opened; great thirst. I gave her a drop of hydro-cyanic acid every half hour. In the evening the fever was so very little abated that I told her father to give the same dose in one table-spoonful of water every half hour *until* the burning heat of skin was removed, and then to give it once in three hours. He continued to administer it regularly every half hour during

the night, but did not strictly attend to the directions I gave to omit it when the heat subsided. Towards four o'clock the child became excessively low, and cold perspiration broke out over her body. I was sent for, and found her pulse very rapid and feeble, but on giving her three grains of carbonate of ammonia every quarter of an hour, she revived in about an hour. All medicine was omitted for that day, and she was directed to live on whey.

7th, Evening.—The child looks very tranquil and free from fever; pulse 120, soft; skin moist; tongue clean; bowels open. From this time she went on well; the cough and whoop never returned, and on the 14th of May she was convalescent. She then went to Brighton, where she recovered her strength, and since that time her health is far better than it used to be before her attack. She has lost all disposition to asthma, and breathes as freely as any of the children.

CASE III.

June 2nd, 1835.—Mary Dearlove, aged fifteen months, residing in Berwick Street; a leuco-phlegmatic-looking child; face swollen; lips blue; alæ of the nose widely dilated; has frequent and violent attacks of cough, with loud hooping; her respiration is short and rapid—40 in a minute, accompanied with much wheezing; chest little dilated by an inspiration, but tolerably clear on percussion; respiratory murmur audible all over it, with loud mucous and crepitating râles; pulse 110, not strong; skin hotter than natural; sleeps little; coughs a great deal in the night; appetite good; tongue clean; bowels open. The child was tolerably healthy till about three weeks ago, when she

was attacked with a severe cough, which came on in paroxysms, and which was accompanied with a whoop about a fortnight afterwards. This child was in the habit of putting her finger down her throat to cause sickness when the cough did not bring up the phlegm easily.

℞ Pulv. ipecacuanhæ - - - - gr.v
Antimonii tartarizati - - - gr.i. M.

Fiat pulvis, statim sumendus.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - ʒiss
Aquæ destillatæ - - - - ʒxv. M.

Fiat mistura. Cujus sumatur cochlearium parvum secundâ quâque horâ.

℞ Hydrargyr. submur. - - - gr.i
Pulv. scammoneæ - - - - gr.iv. M.

Fiat pulvis, quâque nocte sumendus.

4th.—Breathing much relieved by the emetic, which operated well, and produced the evacuation of a considerable quantity of viscid mucus; cough less frequent; respiration much easier; pulse 100; skin cool; mucous râle heard throughout the chest.

Repetantur mistura et pulvis purgans.

9th.—Respiration again hurried and short; loud wheezing; pulse rapid and feeble.

Repetantur pulvis emeticus statim, et mistura.

13th.—Respiration natural; it was immediately relieved when the emetic had operated; child coughs much less; hoops seldom; face less swollen; pulse 90; skin cool.

Perstet.

19th.—Has gone on improving since the last report until the day before yesterday, when the child became very weak and the cough worse. Countenance now distressed and anxious; eyes very languid; cough and whoop more

frequent; pulse very feeble and quick—140; skin cold; —evidently too much depression.

℞ Spiritûs ammoniæ comp. - - ʒss
Vini ipecacuanhæ - - - - ʒi
Liq. opii sedativi - - - - ♏vi
Misturæ camphoræ - - - ʒvii. M.
Fiat mistura. Capiat cochlearium parvum quartâ quâque horâ.

Beef-tea.

20th.—The child looks, and is, much better; countenance more lively; cough the same.

Perstet.

23rd.—Much improved in appearance, but the cough and whoop are increased.

Omittatur mistura spiritûs ammoniæ. Repetatur mistura acidi hydrocyanici.

July 1st.—Cough and whoop nearly gone.

Perstet.

10th.—Quite well.

Omittatur mistura.

21st.—A few days ago the child caught cold, and the cough and whoop returned immediately; now hoops violently; cough troublesome, with much wheezing; pulse 90; skin not hot.

℞ Pulv. ipecacuanhæ - - gr.vi
Extracti conii - - - - gr.xx
Misturæ camphoræ - - ʒi. M.
Fiat mistura. Capiat cochlearium parvum quartis horis.

24th.—Cough much better; whoop ceased. From this time the child improved steadily upon the last medicine, and on the 1st of August was quite well. On taking cold several times afterwards the whoop returned, but it never was violent, and was easily removed.

CASE IV.

3rd June 1836.—Maria Brooker, aged two years and a quarter, residing at 13, Chapel Place, Oxford Street, a leucophlegmatic-looking child; face very much swelled; lips and nose blue; eyes suffused; has violent attacks of hooping-cough, which come on two, and occasionally three, times in an hour; respirations 40 in a minute; chest sounds clear, and it is tolerably dilated by inspirations; respiratory murmur is heard all over it, with very loud sonorous râles; pulse 140, tolerably full; tongue not clean; bowels open; has never been a very healthy child. Three weeks ago she was seized with a cough which comes on in paroxysms; has hooped about a week.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - ʒi
Tincturæ scillæ - - - - ʒi
Aquæ destillatæ - - - - ʒii. M.

Fiat mistura. Capiat cochlearium parvum secundâ quâque horâ.

℞ Hydrargyr. submur. - - - gr.ii
Pulv. scammoneæ - - - - gr.iv. M.

Fiat pulvis, statim sumendus.

Three ounces of prepared-barley gruel or arrow-root every four hours.

7th.—Cough less frequent; whoop ceased; countenance more livid; face more swelled; alæ of the nose dilated; pulse 150; respirations 45; skin hot.

Applicentur hirudines vi. thoraci. Repetantur alia.

8th.—Leeches bled freely; breathing more free; respirations 35; countenance less livid; pulse 140; skin hot; tongue whitish.

℞ Pulv. digitalis - - - gr.i
Pulv. scillæ - - - - gr.ii.

Fiat pulvis, ter die sumendus. Repetantur alia.

15th.—Has continued the digitalis, as well as the other medicine, with daily improvement of the symptoms; face less swollen; pulse 130; respirations 30; cough frequent; whoop returned.

Repetatur mistura secundâ quâque horâ.

22nd.—Cough and whoop less frequent; respirations 24; countenance less anxious, and less livid; pulse 100, more feeble.

Perstet.

29th.—Cough materially better, and whoop less frequent; pulse 100; respirations nearly natural; face still swelled; a good deal of wheezing heard in the chest.

Perstet.

July 6th.—Continues very much in the same state.

Perstet.

13th.—Coughs and hoops fifteen times in twenty-four hours.

Perstet.

20th.—Coughs twelve times in twenty-four hours; in other respects the same.

Perstet.

27th.—Coughs and hoops now eight times in twenty-four hours; the wheezing still remains, but the quantity of mucus expectorated is not great; pulse 100.

Perstet.

August 6th.—Cough and whoop the same; pulse 135, feeble; respirations 30; feet swelled, and pitting on pressure.

Repetatur mistura quartâ quâque horâ.

℞ Pulv. jalapæ - - - - gr.vi
Potassæ bitart. - - - gr.xii.

Fiat pulvis, manè quotidiè sumendus.

13th.—Feet very much swelled; powders produce little

effect; respirations 30; inspirations short; face swollen, but not livid.

Repetatur mistura.

℞ Pulv. jalapæ - - - gr.x
Potassæ bitart. - - - ʒi. M.

Fiat pulvis, manè quotidie sumendus.

20th.—Swelling rather less; breathing somewhat better; pulse weak; skin cool.

Perstet.

She continued with very little alteration in her symptoms until the 3rd of September, when her mother thinks she caught cold. Her breathing became rapid—40 in a minute; pulse 160, full and sharp; skin rather hotter than natural; legs, thighs, and face very much swelled.

Mittatur sanguis è brachio ad ʒiv.

℞ Pulv. digitalis - - - gr.i
Pulv. scillæ - - - - gr.ii. M.

Fiat pulvis, quartis horis sumendus. Repetatur pulv. jalapæ comp.

4th.—Breathing much easier; respirations 30, with wheezing; pulse 120, soft; swelling of the legs and thighs the same; cough short and frequent; no whoop.

Perstet.

7th.—Respirations 25; pulse 100; swelling of the thighs and legs diminished; cough the same.

Omittatur pulv. digitalis. Repetatur pulv. jalapæ comp.

14th.—Swelling much reduced; pulse 100; the child coughs and hoops freely, but not frequently.

Repetatur pulv. jalapæ comp.

℞ Acidi hydro-cyanici - ♏xvi
Tinct. scillæ - - - - ʒiiss
Aquæ destillatæ - - ʒviii. M.

Fiat mistura. Capiat cochlearia duo magna tertiâ quâque horâ.

From this time the child continued gradually to improve; the swelling diminished daily; the cough and whoop became less frequent, and her countenance assumed a livelier expression. She had no drawback; and on the 20th of October she went into the country with her mother, free from cough and difficulty of breathing.

CASE V.

May 15th, 1837.—Elizabeth Rew, aged three years and a half, a leuco-phlegmatic-looking child; face swollen; lips blue; respirations 30; pulse 100, not full; respiratory murmur heard all over the chest, with loud mucous râle; tongue white; bowels open; appetite bad; thirst troublesome;—stated by her mother to have been always a delicate child. On the 15th of April she began to cough, as it was supposed from cold, but on the 1st of May she hooped. The paroxysms are now frequent and violent, and terminate with the expectoration of a considerable quantity of viscid frothy mucus.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - ℈iv
Aquæ destillatæ - - - - ℥viii. M.

Fiat mistura. Capiat cochlearium magnum quartâ quâque horâ.

Three ounces of prepared barley-gruel once in four hours.

22nd.—Cough not any better; whoop violent; paroxysms more frequent.

Repetatur mistura secundâ quâque horâ.

June 3rd.—Continued the medicine without the least

benefit up to this period, when it was discovered that she had only taken one fourth part of the dose intended.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - ℥iv
Aquæ destillatæ - - - - ℨii. M.

Fiat mistura. Capiat cochlearium parvum secundâ quâque horâ.

7th.—Hoops very much less, but coughs every half hour.

Repetatur mistura quâque horâ.

10th.—Hoops scarcely at all; cough said to be as frequent but not so violent; face swollen; mucous râle heard loudly all over the chest; pulse 120, feeble; skin cool.

Repetatur mistura.

℞ Pulv. ipecacuanhæ - - - - gr.v
Antimonii potassio-tartratis - gr.i. M.

Fiat pulvis, statim sumendus.

14th.—The emetic caused an evacuation of a great deal of viscid mucus; cough much less frequent; face scarcely, if at all, swollen; pulse 100, very feeble.

Perstet.

16th.—Cough more frequent but not violent; whoop altogether ceased; the child looks very languid.

Omittatur mistura.

℞ Vini antimonii potassio-tartratis ℨiv
Tincturæ opii - - - - - gutt.xii
Misturæ camphoræ - - - ℨxii. M.

Fiat mistura. Capiat cochlearium parvum quartâ quâque horâ.

18th.—Face swollen; cough much worse; whoop returned; wheezing loud.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - ℨii
Misturæ camphoræ - - - - ℨii. M.

Fiat mistura. Capiat cochlearium parvum quartis horis.

℞ Pulv. ipecacuanhæ - - - - gr.v
Antimonii potassio-tartratis - gr.i. M.

Fiat pulvis, statim sumendus.

20th.—The emetic acted well; face not swollen; cough much better; whoop ceased.

Repetatur mistura.

From this time the child went on improving; the cough became gradually less frequent; and in the middle of July she was perfectly well.

CASE VI.

March 19th, 1838.—Richard Cramphorn, aged six years and a half, residing at No. 17, Gainsford Street, Islington, a pale, thin, unhealthy-looking boy; coughs and hoops very violently. His health has long been delicate. In the middle of February he caught the hooping-cough, which has weakened him very much. Respiratory murmur heard all over the chest, with loud wheezing; respirations 20; pulse 90, feeble; skin cold; tongue white; bowels open; expectorates a great deal of viscid mucus.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini antimonii potassio-tartratis ʒii
Liquoris opii sedativi - - - ʒss
Misturæ camphoræ - - - - ʒxiv. M.

Fiat mistura. Capiat cochlearium parvum quartis horis.

Broth and pudding diet. Warm clothing.

23rd.—Breathing quick and short; pulse very feeble; cough very frequent; whoop violent; loud wheezing.

Repetatur mistura.

℞ Pulv. ipecacuanhæ - - - gr.v
Antimonii potassio-tartratis gr.i. M.

Fiat pulvis, statim sumendus.

April 4th.—Cough and whoop have continued much the

same in point of frequency and violence to this date; a good deal of wheezing accompanies the respiration.

Perstet.

Applicetur emplastrum cantharidis pectori.

He went on in pretty much the same state till the

24th.—The boy looks very languid and weak. His mother says his cough is not better. Upon the supposition that it might be kept up by weakness, the following medicine was ordered:—

℞ Liquoris potassæ arsenitis - - ʒi
Infus. cinchonæ - - - - - ʒiv
Misturæ camphoræ - - - ʒiv. M.

Fiat mistura. Capiat cochlearium magnum ter die.

Meat for dinner.

May 2nd.—Cough more frequent and violent, but the boy looks stronger; wheezing very loud.

℞ Acidi hydro-cyanici (Scheele's) ♏xii
Infus. rhei - - - - - - - ʒii
Infus. gent. comp. - - - - ʒiv
Sodæ sesqui-carbonatis - - - ʒii. M.

Fiat mistura. Capiat cochlearium magnum ter die. Applicetur emplastrum cantharidis sterno.

9th.—Looks much better; feels stronger and more disposed to play about; coughs much less frequently; hoops only at night.

Perstet.

To be out the greater part of the day when the weather is warm.

16th.—Very much improved in appearance and colour; coughs very little; has not hooped for the last three days; bowels open; appetite good.

23rd.—Cough all gone. Perfectly well.

CASE VII.

April 30th, 1838.—Mary Anne Bonner, aged ten years, residing in Goswell Street, a pale leuco-phlegmatic-looking girl; had enjoyed tolerably good health until the 7th of November 1837, when she had a violent attack of rheumatism, which altogether deprived her of the use of her limbs for fourteen days. The pains subsided in about six weeks, but she remained very weak and languid, and complained of pain in the region of the heart. On the 7th of February she was brought to me. The action of the heart was then much accelerated and tumultuous; pulse 120, not irregular; impulse of the heart much stronger than natural; sound not easily described; loud and rough *bruit de soufflet* accompanying the heart's impulse; skin cool; tongue white; bowels open; she complained also of pains flying about in different parts of her body, particularly in the joints, but they were not swelled. She took the following mixture—

℞ Potassii iodidi - - - ʒi
Potassæ bi-carbonatis - ʒii
Vini seminum colchici - ʒiiss
Aquæ menth. virid. - ℥viiss. M.

Fiat mistura. Capiat cochlearium magnum quater indies.

and continued it with very decided benefit till about the 30th of April, when she was free from pain in the limbs, and had lost all uneasiness in the region of the heart. She had had a cough about three weeks, but it was not noticed, her mother supposing it was part of her complaint; but on the morning of this day she hooped so violently that she brought her again to me. Her face was much swelled,

but pallid; respirations hurried, 40 in a minute; very slight wheezing; inspirations short; alæ of the nose dilated; chest not much moved by a full inspiration; pulse 120; bowels open.

℞ Acidi hydro-cyanici (Scheele's) ʒss
Tincturæ scillæ
Vini ipecacuanhæ - - - āā ʒiss
Misturæ camphoræ - - - ʒxiii. M.

Fiat mistura. Capiat cochlearium parvum quartis horis.

Applicentur hirudines viii thoraci.

℞ Pulv. digitalis - - - - - - gr.i
Pulv. scillæ - - - - - - - gr.ii
Hydrargyri chloridi - - - gr.i. M.

Fiat pulvis, ter die sumendus.

May 2nd.—Breathing better; pulse 100; respirations 25; wheezing loud; whoop and cough frequent, often three times in an hour.

Repetatur mistura secundâ quâque horâ. Omittatur pulv. digitalis, &c.

6th.—Breathing quiet; pulse 100; respirations 22; cough and whoop less.

Perstet.

11th.—Face swelled; wheezing troublesome; cough still frequent; breathing rapid and oppressed.

℞ Hydrargyri chloridi - - - gr.i
Pulv. ipecacuanhæ - - - - gr.i
Pulv. scillæ - - - - - - - gr.ii
Ext. conii - - - - - - - gr.ii. M.

Fiant pil. duæ, ter die sumendæ. Repetatur mistura quartis horis.

18th.—Breathing very much better; wheezing nearly gone; respiration still rapid; pulse 100; cough and whoop less frequent—worst on rising in the morning, when she throws up a good deal of viscid mucus.

Repetantur omnia.

25th.—Child's appearance much improved; coughs and hoops very little; pulse 100; continues to throw up a good deal of viscid mucus every morning; some mucous râle heard with the cough.

℞ Pulv. ipecacuanhæ - - - gr.v
Antimonii potassio-tartratis gr.i. M.

Fiat pulvis, manè quotidie sumendus. Repetantur pilulæ et mistura antea prescriptæ.

June 1st.—Whoop ceased altogether on the 28th ult. Coughs very little, and that only when she wants to expectorate. Her mother says she is now as well as she has ever been since she had the rheumatic attack. To relieve her of the chronic affection of the bronchiæ, the emetic was directed to be repeated every other morning. Though she seems perfectly recovered, her pulse continues at 100; a *bruit de soufflet* accompanies the systole of the ventricle, and the face remains fuller than natural; but these are all the remains of the endo-carditis brought on by rheumatism, and are not likely ever to be altogether removed.

From the foregoing cases it will be perceived that inflammation of the bronchial membrane does not stop the whoop unless it be so very severe as mechanically to oppose the entrance of air into the lungs. Under these circumstances the whoop ceases, but it returns when the inflammation is subdued.

It further appears that hydro-cyanic acid seems to have little or no power in arresting the progress of inflammation; for Miss Ellen E., Case II., and Maria Brooker, Case IV., were attacked with bronchitis at the very time they were using it freely. Its principal use is, to check the

cough and the whoop; but when severe inflammation is present, bleeding, either locally or generally, must be resorted to, with digitalis, which should be continued until it affects the system, or till the dangerous symptoms are removed.

Case II. shews how insidiously this form of disease creeps on, and how it may escape the notice of the most anxious and affectionate of mothers. If that child had not been seen by some medical practitioner, as she was by me accidentally, she could not, in all probability, have survived many days. Towards the latter period of her case we find her labouring under low fever, which was much relieved by the use of hydro-cyanic acid; but the effect produced by the exhibition of it after the necessity for it had ceased, warns us not to entrust this remedy to the hands even of the kindest and most attentive parents. When suffering from the fever she neither coughed nor hooped; there was a little hacking, but she seemed unable to cough from weakness.

Case III. affords a good exemplification of the principle which has been laid down, that where a child is already too much depressed, cough will be increased rather than diminished by further depression; that stimulation under such a state relieves the cough, but that it is aggravated again as soon as the stimulants have taken effect.

Case IV. is one in which the mucous membrane was affected with chronic inflammation for some time, and the disease lasted a longer period than usual. When the inflammation became so active as to justify bleeding, it was speedily subdued, and the cough and whoop soon got well.

Case V. has nothing remarkable in it, except that antimonial wine and tincture of opium failed when the child

was so languid that it appeared advisable to leave off the acid; but when it was resumed it acted well again.

Case VI. was one of chronic bronchitis in a weakly boy in bad health. For some time the medicine had but little good effect upon it. Supposing that the disease might be kept up by weakness, I tried the liquor arsenicalis with bark, but the child was worse rather than better for taking it. The combination of a tonic with the acid seems to have been most useful to him, and as his health improved the cough left him.

Case VII. was one of unusual severity, in which the heart had been inflamed by an attack of rheumatism, and the child was in a very weakly condition when seized with hooping-cough. The lungs must have been gorged with blood by the long continuance of an accelerated action of the heart. The valves of the aorta were diseased. Bronchitis attacked the child in this condition, and therefore it would not have been wonderful if the cure had been slower than it was. Strong but safe remedies were employed in this case, the benefit of which is evident; under a milder plan of treatment the child would certainly have died.

CHAPTER X.

COMPLICATION OF PNEUMONIA WITH HOOPING-COUGH.

Pneumonia usually attacks plethoric children — Generally proves fatal—How plethora is induced—Its effect on the physical condition of the lungs—Symptoms of pneumonia—Physical signs—Post-mortem appearances—Treatment—Importance of prompt measures — Bleeding; sedatives; cupping—Cases illustrative of this complication—Reflections thereon.

Hooping-cough complicated with pneumonia, or inflammation of the lungs, which we come now to consider, is a form of the complaint which usually attacks plethoric children. It may arise either from the severity of the cough bringing on a congested state of the lungs, or from the subject of the attack being a person whose lungs had been previously gorged with blood. It is a complication which in the majority of cases proves fatal, unless the treatment is commenced before the inflammation is established.

The quantity of food which children are permitted to take produces in those who have strong constitutions a state of venous plethora, which is evinced by a bloated

unnatural to that period of life. The vessels are charged with more blood than is consistent with the due performance of the various functions of the body; the lungs partake of this congestion, and consequently contain less air than they do in a healthy state; but this alteration in their physical condition takes place so gradually, that no disturbance of the respiratory function is perceived in children so affected, except when they are taking active exercise. Should hooping-cough attack children in such a state, the violence with which the blood is driven through the lungs, the severity of the cough, and the obstruction opposed to its return by the long-continued expirations, increases the congestion, and thereby the vessels which supply the mucous membrane of the lungs, as well as those which permeate their substance, are distended; the air vesicles therefore are compressed, and the air cannot enter as it should into the minute cells in which the bronchial tubes terminate. The longer the disease continues, the more cells are obliterated, until at length respiration is performed principally by the bronchial tubes. Whilst this is going forward, the natural secretion of the mucous membrane of the bronchiæ is increased, and morbidly changed; the power of expectorating it is diminished; the cough becomes short and feeble; the whoop ceases; and unless speedily relieved, the child dies of suffocation.

"Peripneumony," says Dr. Darwin, "very frequently supervenes, and destroys a great number of children. When the child has permanent difficulty of the breathing, which continues between the coughing fits, unless blood be taken from it, it dies in two, three, or four days, of inflammation of the lungs. During the permanent difficulty of breathing, the hooping abates, or quite ceases, and re-

turns again after once or twice bleeding, which is then a good symptom, as the child now possessing the power to cough, shews the difficulty of breathing to be abated."

The symptoms to which this state of the lungs gives rise are, general fever; a bloated and livid appearance of the face; constant motion of the alæ of the nose; rapid respiration; short inspiration. In this state, though the muscles of respiration are in violent action, the chest appears almost motionless; and the countenance is expressive of the greatest distress. The paroxysms of coughing are short, but without a whoop; blood drawn from the arm is cupped and buffed; the expectoration is of a rusty colour; and the water is dark, and deposits a copious brick-coloured sediment. If the disease proceeds, the breathing becomes hourly more difficult; cold perspiration breaks out over the head and chest; the pulse becomes feeble, and very frequent; and the child lies in a state of drowsiness or stupor, at times talking very incoherently, but capable of understanding what is said when roused, until it expires.

The Physical Signs of this complication are the following:—At the very first beginning of inflammation, crepitating râle commences, and the respiratory murmur is heard at the same time with the râle. As inflammation advances, the crepitating râle becomes more moist, and the respiratory murmur gradually decreases. Lastly, the crepitating râle ceases to be heard, and hepatization begins. The sound of the chest on percussion differs very little from that which is proper to the natural state, unless the engorgement is very extensive, and approaching to the condition of hepatization, in which case it is more or less dull. This is a brief outline of the physical signs of Pneumonia, as given by Laënnec. In the majority of the cases of pneumonia

complicated with bronchitis which I have met with, œdema of the lungs has succeeded to acute inflammation. The physical signs of this condition, according to the celebrated physician just referred to, are very obscure. Oppression of the breathing, slight cough, and an almost watery expectoration, are the only signs by which we can be led to suspect its existence. The chest sounds dull on percussion; bronchophony is heard at the root of the lungs; but the long continuance of the crepitating râle, and the absence of the general signs of inflammation, permit us almost always to distinguish œdema of the lungs from peripneumony in its first stage, even in those cases where these affections are united.

Morbid Appearances.—When the chest of a child labouring under these affections is opened, the lungs do not collapse; the inflamed parts are of a livid colour externally, and much heavier and firmer than they are in their natural state. When pressed by the finger, they retain its mark; when cut into, their tissue appears of a vermilion red colour, and infiltrated with a bloody serum, which pours out freely from the surface of the incision; some parts of it are firmer and more compact, resembling liver; when thrown into water they sink; the bronchial tubes are filled with a rusty-coloured mucus.

Treatment.—Abstraction of blood by venæsection, the moment the crepitating râle is heard and the breathing becomes difficult, is the only thing which affords a hope of saving a patient who is labouring under this complication; but after the lungs have been gorged with blood, portions of them hepatized, and other parts infiltrated with bloody serum, his recovery is almost impossible. Upon the first appearance of the disease, blood should be

taken from the arm as freely as the strength of the child will allow,—two, three, or four ounces at a time,—and the operation should be repeated when the difficulty of breathing returns, or when the child has recovered from the depression which the previous bleeding had caused. The maxim laid down by Laënnec is a good one—namely, that when the pulsations of the heart are much stronger in proportion than those of the arteries, we may bleed without fear. Sometimes, however, bleeding is useful when both heart and arteries beat feebly; but we should always bear in mind that it is necessary, under such circumstances, to act with great circumspection. The object is, to unload the vessels of the lungs, and to prevent their being again distended. This is better done by repeated small bleedings than by taking a large quantity of blood at one time. Immediately after bleeding, some sedative medicines should be given. In cases of debility, when the pulse is feeble, and the patient unable to bear such remedies as digitalis, tartar-emetic in doses of a grain for an adult, or half a grain for a child, dissolved in two ounces and a half of infusion of orange leaves and half an ounce of syrup of orange flowers, exhibited every two hours, as recommended by Laënnec, is perhaps one of our most useful remedies. The first two or three doses produce vomiting; the succeeding doses act pretty strongly as purgatives, and often afford great relief to the breathing. If the pulse be very full and strong, digitalis and squills with calomel may be given every fourth hour, until some degree of feebleness is induced, when it should be immediately stopped, as a longer continuance of it might be fatal.

Cupping upon the chest, when the child is not very young, is a most useful remedial measure, and may be

repeated according to the strength of the patient. Blisters, when the lungs are in this state, have little or no effect in subduing inflammation; and hydro-cyanic acid is useless—it seems to depress the general system, without lowering the pulse. When, however, the inflammatory affection is removed, and the cough returns, the acid may be administered for the relief of the latter with good effect.

Three of the cases annexed terminated fatally, as by far the majority do when the substance of the lungs becomes affected. They will, however, illustrate the symptoms manifested by this form of the disease.

CASE I.

M. A., aged five years, a stout, short-necked child, residing in Guilford Street, Borough, was seen by me on the 5th of June 1833. Her complaint, which was supposed to be an ordinary cold, had commenced with a cough about three weeks before, but a fortnight afterwards she hooped violently; her breathing was from the first slightly affected, but for the last few days it had been very laborious; her face was bloated and livid; alæ of the nose in constant motion; respiration short and rapid; chest very little dilated by inspiration, and sounding duller than natural on percussion; respiratory murmur audible in some parts, totally absent in other parts; pulse quick and sharp—140; skin covered with cold perspiration; bowels open; tongue white; countenance exceedingly distressed; cough short and frequent; whoop altogether ceased.

Mittatur sanguis è brachio ad ʒii.

℞ Pulv. digitalis - - - gr.xii
Hydrargyr. submur. - gr.x
Pulv. scillæ - - - - gr.xx. M.

Fiant pilulæ ix. Capiat unam quartâ quâque horâ.

6th.—Breathing not at all relieved; lividity of the countenance the same; respiration very short; pulse 160.

Mittatur sanguis è brachio ad ʒii. Repetantur pilulæ digitalis &c.

7th.—Pulse soft, but very quick. She was now directed to take three-fourths of a grain of tartar-emetic, in three ounces of weak simple infusion of oranges every second hour.

8th.—The first two doses of the mixture ordered yesterday produced vomiting; but the continuance of the medicine had no effect upon either stomach or bowels. The child is very drowsy; breathes with very great difficulty; pulse 180, very feeble. The weakness gradually increased, and at ten o'clock at night she expired.

Post-mortem examination.

On opening the chest, the blood appeared to be remarkably black and unusually fluid. The lungs scarcely collapsed at all; they felt remarkably firm and unyielding; a longitudinal incision was made into their substance, from the surface of which a considerable quantity of blood flowed, with a good deal of red-coloured serum: several patches were found of a darker colour and of firmer consistence than the rest; these were so free from air that they sank in water; the extreme branches of the bronchial tubes were filled with rusty-coloured mucus, but the lining membrane was healthy.

CASE II.

Ellen M., aged seven, residing in Marshall Street, Golden Square, was brought to me on the 1st of May 1836, suffering under hooping-cough. She was a very stout but well-formed child; her face, especially the nose and lips, was very much swelled, and of a livid colour; her breathing was short and very rapid; the alæ of the nose were much dilated; very few words could be uttered by her without taking an inspiration; respirations 50; pulse 160, but not strong or full; the chest on percussion was much duller in sound than is natural, and it moved very little, whilst the abdomen heaved violently; on auscultation, the respiratory murmur was audible all over the thorax, with very loud crepitation accompanying both inspiration and expiration; skin cool; tongue white; bowels open; her cough was very short and free from whoop; the expectoration was abundant and watery. Her complaint had begun three weeks before with a common cold, which in about ten days was attended with a whoop; but as she was a strong child, it did not alarm her mother. For the last few days it was perceived that her breathing was becoming worse, though she did not complain of it, and that her cough was shorter and more frequent, though now without whoop.

One grain of tartar-emetic every second hour, in a little very weak camomile-tea.

2nd.—Visited at home; not at all better; respiration as yesterday; pulse very feeble and rapid. The tartar-emetic made her sick two or three times, and caused the evacuation of some rusty-coloured mucus.

Perstet.

3rd.—Child very drowsy; wheezing heard at some distance; pulse very rapid; breathing laborious.

Perstet. Applicetur emplastrum cantharidis sterno.

Her breathing became gradually worse towards night, with loud wheezing; and she expired about two o'clock next morning. Her body was not examined.

CASE III.

1st May 1836.—I was requested to visit the infant child of Mrs. K., residing in Newman Street, Oxford Street, with an eminent surgeon. Susan K. aged nine months, had been a healthy infant until about three weeks before, when she caught cold. Her mother said she had had a cough, but it was not violent, nor was it attended with a whoop. On the 28th of April, her breathing had become rapid and oppressed. Three leeches were applied to the chest, and a blister to the back of the neck, which afforded no relief. She gradually grew worse until I saw her about nine o'clock in the evening. Her respirations were then 50; pulse very frequent—about 160, as well as it could be counted; skin rather hotter than natural; cough short and frequent; no whoop; chest scarcely dilated on inspiration; her bowels were open; motions not unhealthy. There was very little hope of doing anything for a child in this condition, but we prescribed—

℞ Acidi hydro-cyanici (Scheele's) ♏viii
Vini ipecacuanhæ - - - - ʒiss
Aquæ destillatæ - - - - ʒii M.

Fiat mistura. Capiat cochlearium minimum quartâ quâque horâ.

To be suckled not more than once in three hours.

2nd.—No improvement; breathing excessively quick; cough short.

Perstet.

3rd.—Pulse seems a little softer—150; respiration still very rapid; but the child looks somewhat less distressed.

Perstet.

4th.—Skin hotter than usual; pulse sharper—160, with more strength; face very blue; alæ of the nose much dilated.

℞ Pulveris digitalis - - gr.xii
Pulv. scillæ - - - - ℈i
Aquæ - - - - - - ʒii. M.

Fiat mistura. Capiat cochlearium parvum quartâ quâque horâ.

Nine o'clock in the evening.—Pulse still sharp; respiration very much hurried; face very livid. We consulted together on the propriety of continuing the digitalis through the night, and, as the child was in so hopeless a condition, we thought it better to run the risk than to abandon the child altogether. The mother was desired to give the medicine, with a caution to desist if the child should look feeble or become cold. Soon after five in the morning of the 5th we saw the child, and found her very much depressed. The pulse was feeble and intermitting; skin cold; covered with perspiration. A little brandy and ammonia were given her, but she expired in a few hours. Her body was not examined.

CASE IV.

John Spenceley, aged four years and a half, residing in Wardour Street, Soho, was brought to me at the Westminster Hospital, on Saturday the 19th of May 1838,

suffering under an attack of acute pneumonia, which had supervened upon hooping-cough. The child appeared to be in such imminent danger that I told his mother she might bring him to my house every morning, as I feared that, unless he were closely watched, he might die before my next day for seeing out-patients. He lay upon his attendant's arms, heavy, drowsy, and disinclined to be moved; his face was much swelled; lips swollen, and very livid; eyes excessively dull; chest moving very little, but rapidly; respiration more like panting than the exercise of a natural function—60 in a minute; on percussion, the thorax generally sounded duller than natural, especially the left side; the respiratory murmur was audible, with moist crepitation; pulse 180—sharp, but not full; skin covered with perspiration; cough frequent and violent during the day, and much worse at night, when he becomes very hot, but it had not been accompanied with a whoop for some days; tongue white; bowels open; much thirst. His mother says that he was a very healthy child till about the end of April, when he was seized with hooping-cough, which has been gradually getting worse up to the present period, in spite of all the remedies which have been given to check it.

℞ Vini antimonii potassio-tartratis ʒiss
Tincturæ camphoræ - - - - ʒiv. M.

Fiat mistura. Capiat cochlearium magnum quartis horis.
To be given in a small wine-glassful of weak camomile-tea.

20th.—Appears rather better, if anything. The first two doses of the medicine made him sick, but the rest acted on the bowels, purging him four times since yesterday; breathing still very much oppressed; pulse 170; crepitation continues.

Perstet in usu vini antimonii potassio-tartratis.

℞ Hydrargyri chloridi - - - gr.i
Pulveris scammoneæ - - - gr.vi. M.

Fiat pulvis, statim sumendus.

21st.—Very little change; seems less dull.

Perstet.

24th.—Appears better; breathing easier; pulse quieter; crepitation nearly gone; but, up to this date, no very material alteration of the symptoms has occurred since the last report, though the child was seen daily; nor was the mixture reported to have caused sickness. On inquiry, it was found that the medicine prescribed for his sister, who was suffering from the same complaint, had been given to him instead of his own, and that he had been taking one minim of hydro-cyanic acid, and six of ipecacuanha wine, every two hours since the 21st, instead of half a grain of tartar-emetic. As, however, he appeared better, his mother was desired to continue the hydro-cyanic acid, which was then prescribed.

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Vini ipecacuanhæ - - - - - ʒiss
Aquæ destillatæ - - - - - - ʒii. M.

Fiat mistura. Capiat cochlearium parvum secundâ quâque horâ.

25th.—Seems very much better; pulse 140; has not coughed more than twice this morning; skin cooler; breathing easier; respirations 36; the crepitation has ceased, and in its room are heard loud mucous râles accompanying both the inspirations and expirations.

Repetatur mistura quartis horis.

26th.—Seems much better, and is more lively; pulse 120.

Perstet.

27th.—The same as yesterday.

Perstet.

28th.—Breathing more oppressed; pulse 132; respiration accompanied with loud wheezing; coughs very often; was more feverish than usual last night; has frequent desire to have an evacuation.

℞ Pulv. ipecacuanhæ - - - gr.v
Antimonii potassio-tartratis gr.i. M.

Fiat pulvis, statim sumendus.

Applicetur emplastrum cantharidis sterno. Repetatur mistura. Capiat olei ricini ʒiv statim.

29th.—Breathing much relieved; pulse 120.

Repetatur mistura.

30th.—Pulse 130—possibly accelerated by having just had a violent fit of coughing; coughs a good deal in the morning, and brings up a considerable quantity of phlegm.

Repetatur pulvis emeticus manè quotidie. Perstet in usu acidi hydro-cyanici.

31st.—Pulse 120; breathing much easier; cough less frequent.

Repetantur omnia.

June 1st.—The respiration is hurried and accompanied with much wheezing, but he has not yet taken his emetic; his mother says that towards evening he wheezes a great deal, and continues to do so until he takes his emetic in the morning.

℞ Antimonii tartarizati - - - gr.viii
Acidi hydro-cyanici (Scheele's) ♏xvi
Aquæ destillatæ - - - - - ʒviii. M.

Fiat mistura. Capiat cochlearium magnum secundâ quâque horâ.

2nd.—Seems better, but still wheezes very much, in spite

of the medicine, which does not make him sick. Bowels confined.

Repetatur pulvis emeticus manè quotidie. Perstet in usu misturæ.

℞ Hydrargyri chloridi - - - - gr.ii
Pulv. scammoneæ - - - - gr.iv. M.

Fiat pulvis, singulis noctibus sumendus.

3rd.—Evidently improves; cough frequent, but not violent.

Perstet.

4th.—Sits up now, and talks composedly; seems weak; cough very frequent, but slight; longs for more food; pulse sharp—120.

Repetatur mistura secundâ quâque horâ; sed adde liq. opii sedat. ♏xvi. Repetantur alia.

5th.—Looks very much better; breathes easily; coughed twenty-one times since yesterday morning; appears languid, but he is no longer lying down in his mother's arms, and his pulse has so much strength in it as to make it questionable whether he should not be bled; skin rather hot; some sibilant râle is heard on applying the ear to the posterior part of the chest, but no wheezing.

Repetatur mistura quâque horâ quamdiù calor perstiteret. Repetantur alia.

6th.—The medicine was given to the child according as the fever was present or absent—sometimes every hour, at other times once in three hours. His skin is now cool; pulse 130, soft and feeble; cough continues frequent and violent, but without a whoop; still much wheezing in the chest.

Repetantur mistura, pulvis emeticus, et pulvis purgans.

9th. — Cough very much abated in frequency and violence; only one paroxysm last night, and none this morning; very little wheezing, though he has not taken the emetic; general appearance much improved; countenance pallid, and expresses a good deal of weakness; pulse 120, very feeble; skin soft. As he was free from fever both during the night and in the day, the medicine was given at intervals of three hours, and some beef-tea was allowed him for the last two days.

Repetantur mistura tertiâ quâque horâ, et pulvis purgans quâque nocte.

14th.—Respiration quiet; cough nearly gone. He now eats meat with a good appetite, sits up, and talks cheerfully; and may be said to be convalescent, but weak.

The tartar-emetic was now omitted, and a little opiate mixture given to remove the cough.

We have inserted but few cases of this form of complication, as the symptoms and terminations are generally so much alike. If much blood be abstracted, the child sinks under exhaustion; if a good deal be not taken, he dies of suffocation. We may by active measures arrest the progress of pneumonia, and avoid the danger, provided the patient be seen very soon after it commences; but when once the lungs have become gorged with blood, or partial hepatization has taken place, little or no hope can be entertained of a recovery. The first three cases shew how little effect is produced under such circumstances by bleeding, leeching, digitalis, or hydro-cyanic acid, and how speedily death takes place.

Case II. is an example of the coincidence of œdema with pneumonia; the chest was dull on percussion, and the expectoration was watery and thin. This, I believe, often occurs complicated with bronchitis.

Case III. affords an instructive lesson as to the dangerous quality of digitalis, and the necessity of watching the patient who is taking it. The almost certainty that the child would die if something were not done—the heat of the skin, quickness of the pulse, &c., alone justified its exhibition; and as mothers are much more likely to err on the side of supposing a child to be low when it is not, than of thinking it strong when it is weak, we entrusted it to the parent without apprehension of danger, relying upon her watchful eye. No doubt, however, it was given when it should have been withheld, and its effects were the immediate cause of death. But this child's condition was almost hopeless; the engorgement of the lungs with blood was too great ever to be removed; and therefore, though her death may have been hastened a few hours, there can scarcely be a doubt that it would have soon occurred from suffocation, even had the digitalis been stopped in due time.

Case IV. is a very encouraging one, as it shews how much may be done by close watching under circumstances apparently hopeless. That stage of the disease had gone by in which medical treatment could be adopted with the prospect of a successful result; for the lungs had become gorged with blood, the breathing was exceeding distressed, and the child was too weak to be bled. The case therefore illustrates the power of tartar-emetic in subduing pulmonary inflammation, even when far advanced; and shews with what impunity that very depressing medicine may be given when its influence is resisted by an active disease. It may

be observed that the medicine gradually removed the crepitation, without either causing sickness or acting upon the bowels; its *modus operandi* is therefore not very evident, but its efficacy in this form of complication appears to me to be greater than that of any other remedy with which we are acquainted.

The frequency with which this complication issues in a fatal result should act as a warning to parents to seek advice for plethoric children without delay. If they neglect to do so, the lapse of a very few hours will suffice for the production of those organic changes which are the cause of death, and which, though they might have been prevented, can never be altogether removed.

CHAPTER XI.

COMPLICATION OF HYDROCEPHALUS WITH HOOPING-COUGH.

Not so frequent as might be expected—Predisposition in those who are affected; to what this is owing; characteristics denoting it—Convulsions—Symptoms which precede them—Hydrocephalus without convulsions—Treatment—Instances of convulsions from exhaustion—Symptoms must direct the treatment—Cases—Reflections thereon.

Complication of remittent fever with hooping-cough—Symptoms—Treatment.

The effects which a violent paroxysm of hooping-cough produces upon the circulation, driving the blood into the head with great force, and distending the veins of the face and neck so as to give a livid hue to the countenance, might lead us to contemplate hydrocephalus, or water in the head, as a complication of the former disease naturally to be expected, and to suppose that the probability and frequency of its occurrence would be in proportion to the severity of the cough. But this is not borne out by experience; on the contrary, many children escape with perfect impunity whose cough is so violent as to terrify the

by-standers—forcing blood from the eyes, ears, and nose—whilst some are speedily attacked with affections of the head whose cough is so slight as to attract but little attention. It is clear, therefore, that neither is the increased violence with which blood is sent to the head, nor are the impediments which are offered to its return by a severe paroxysm, alone sufficient to produce hydrocephalus. There must be in the brain of those who are thus affected a predisposition to, or susceptibility of, that form of inflammation which ends in the secretion of fluid. This predisposition, however, arises not so much from hereditary constitution as from a state of the brain, which is owing to improper management in infancy. That children derive from their parents a certain mould of constitution, as well as of external figure, cannot be denied; no other cause can be assigned why, of two children reared in every respect alike, one shall be strong and healthy, the other weakly and delicate. But such mistakes are every day committed with regard to the feeding, clothing, and exercise of children, that these causes may contribute, as much as hereditary predisposition, to render some children more susceptible than others of certain diseases.

If, from any cause whatever, digestion be imperfect, the blood which is formed will be unfit for the purpose of nutrition; the system, therefore, will be made up of materials imperfectly elaborated, and consequently the bones will be soft, and unable to sustain the weight of the body, the brain will be devoid of that firmness and consistence which is proper to a state of health, and the whole structure will be defective in strength, energy, and natural beauty. In the appearance of the children who are attacked with hydrocephalus, there is generally some-

thing which leads their parents to apprehend in them a liability to this disease: the head is large, and the forehead very prominent; the face white; the pupils of the eyes are dilated; and the muscles soft and flabby. A child with these characteristics may have hooping-cough very mildly, and apparently sustain so little injury from its attacks that no fear is entertained of its ultimate recovery; yet suddenly, after some violent paroxysm of coughing, it is seized with convulsions. When the fit is over, the eyes are observed to be dull and heavy, and the pupils much contracted; the pulse accelerated; the temporal arteries beat with great force; and the child is much disposed to sleep. At every severe accession of the cough, the convulsions recur; the pupils of the eyes by degrees dilate; the child falls into a comatose state, from which he is roused only by the fits, and often in one of them he expires.

I believe, however, that convulsions seldom or never happen without the occurrence of some previous symptoms. A marked change takes place in the natural manner of the child; he is drowsy and fretful at the same time, or dull and heavy; the pupils of his eyes are contracted, and his bowels are constipated. If the parents and medical attendant maintain a system of careful observation, these signs will afford them a sufficient warning of the approach of this formidable affection.

Very often an attack of hydrocephalus is preceded by symptoms sufficiently marked to attract attention—such as violent contraction of the toes and thumbs; aversion to light and noise; screaming in the sleep; and grinding of the teeth. "In a child from seven months to two years of age, who has had the hooping-cough, if we observe," says Dr. Johnstone, "that the paroxysms become suddenly

increased in violence, that the thumbs are drawn into the palms of the hands, while there is no accession of bronchial inflammation to account for the increase of cough, we may apprehend convulsions. If, however, in addition to these symptoms, the child, after each fit of coughing, instead of hooping, becomes livid, we may calculate to a certainty on convulsions, if suitable means be not employed to ward them off. If the child has ever had the swelling of the top of the fingers and toes noticed by Dr. Kellie, of Leith, or the peculiar spasmodic affection described by Dr. Clark, and more recently by Dr. Marsh, under the title of 'Spasm of the Glottis,' we can scarcely expect that he will pass through the hooping-cough without an attack of convulsions." If these fits return frequently, the case will most probably pass into hydrocephalus.

Hydrocephalus occasionally creeps on insidiously without being preceded by convulsions. If a child affected with hooping-cough should become feverish and restless, his pulse very quick, his respiration irregular, at times much quicker than at others, as we see in common fever, we should immediately adopt measures to ward off the affection of the brain.

After a child has been attacked with convulsions, the whoop often ceases, and returns when the head is relieved; but when hydrocephalus has taken place, both cough and whoop always cease, and the child lies in a state of unconsciousness.

Treatment.—Notwithstanding the violence with which the blood is driven into the head during the paroxysms of hooping-cough, it is not sufficient, as we have seen, to cause convulsions or hydrocephalus without some predisposition or peculiar susceptibility; yet when these complications do

occur, they almost always arise from either inflammation or congestion of the brain, in consequence of that violence; and therefore local depletion, with the exhibition of those medicines which enfeeble, for a time, the heart's action, are the treatment indicated. It must, however, be borne in mind, that convulsions may occur from very opposite causes. I have long believed that diminished power of motion in a limb, convulsions, and sometimes even paralysis itself, may be occasioned by exhaustion of the nervous power of the brain, or spinal marrow, as well as by pressure on these organs, or congestion of their vessels; and a case has lately occurred which clearly proves that convulsions may be owing to a state of brain the very opposite of fulness. In conjunction with Mr. Matthews of Seymour Street, I lately attended two children of Mrs. H., residing in Bentinck Street. The one was thirteen months old, a remarkably pallid-looking child, suckled by his mother, who was a very delicate woman; the other was rather more than three years old, a sickly-coloured child, with a large head, and dull eyes. Both suffered from a cough, which I believe to have been hooping-cough; but as the whoop was heard by the nurse and parents only, and not by Mr. Matthews, who was frequently there in the day, I did not class their cases in my note-book under that head. Both children were affected about the same time with violent convulsions. We had no hesitation in cupping the ·lder boy, but we felt it necessary to deliberate seriously ·he case of the younger one. His thumbs were drawn ·he palms of his hands; he was restless, and very ·g down at one moment and sitting up the next; was very hot. He had, however, so much ·f anæmia, that we believed the fits arose

from the state of the nervous system produced by that condition, and proposed to give him opium. The fits were, however, so violent that, as a measure of precaution, we agreed that one ounce of blood should be taken from the temples by cupping in Mr. Matthews' presence. The restlessness was very much increased by the loss of even that small quantity, and therefore two minims of liq. opii sedativi were immediately given, which produced such a decidedly good effect that Mr. Matthews repeated the dose at twelve o'clock the same night; after which the child recovered, and never had another fit. This is a rare case; but the possibility of convulsions occurring from such a cause is enough to prevent us from rashly deciding that a child must lose blood because he has had a fit. Master W. S., one of the cases of simple hooping-cough, on two occasions had severe fits, evidently from debility; brandy and quinine were given, which restored him, and the fits did not return. I will not, however, dwell longer on the subject at present, as I propose laying before the medical profession, shortly, the result of my experience in affections of the head.

In an ordinary case of convulsions, when a child exhibits any signs of excitement about the brain, local depletion, either by leeches or cupping, with sedative remedies, appears to be the appropriate treatment,—attending at the same time to any derangement of the stomach and bowels which may be present. If the subject of this affection b above three years of age, and the fever be high, bleed from the arm may be necessary.

The medicine in general use is calomel, e doses of two grains every four hours; but I in it unless it be combined with some sed

tartar-emetic, or colchicum. If the cough and whoop continue, hydro-cyanic acid may also be given, as directed in the chapter on Simple Hooping-cough; but if the child be insensible, or the cough and whoop have ceased, that remedy will be useless. Warm baths, when there is much cerebral excitement, do harm, by determining the blood to the head; when an opposite state is present, warm baths may be useful. Blisters, in general, are a very inefficacious remedy. Sometimes, however, they have, contrary to all expectation, roused a child from a state of insensibility,—an instance of which was lately related to me by Mr. Fisher, of King Street, Snow Hill. Purgatives are often useful in ordinary convulsions, but I believe they are of little avail when the fits are produced by hooping-cough.

Different cases, however, of this form of complication are attended by such a diversity of symptoms, and are seen in such various stages of the complaint, that no specific rules of treatment can be laid down; but we must be guided in each particular case by the indications which the symptoms present afford.

CASE I.

On the 9th of April 1833, Henry Weeks, aged two years and seven months, residing in King Street, Soho, a pallid leuco-phlegmatic-looking child, with a large head the sutures of which were closed, was brought to my house suffering under hooping-cough with convulsions. He had never been a healthy child. A few weeks after his birth, his mother perceived that he had in the left inguinal region a hernial tumour, which she completely cured by the appli-

cation of a truss. Ever since he was weaned he had been troubled with a cough, which grew worse when he was cutting his teeth, and was always aggravated when he took cold. About three weeks ago the cough became more frequent and violent, but still it was supposed to be nothing more than his habitual cough, increased by cold. On the 31st of March, however, he hooped. Several children living in the same house with him had the hooping-cough also; but no advice was sought for them, under the idea that there was no cure for that complaint but change of air. Since that period, the cough and whoop had much increased in severity. The day before I saw him, he had a convulsive fit, which lasted twenty minutes, and left him very drowsy and heavy. He slept very heavily during the night, but revived in the morning. When he was brought to me, his face was slightly swollen; head hot; eyes dull and anxious,—the pupils much contracted; skin feverish; pulse 100, but not strong; respiration rather quicker than natural—about 25 in a minute—and accompanied with loud wheezing; the chest moved freely, and sounded naturally on percussion; on applying the ear to it, the respiratory murmur was heard distinctly, both anteriorly and posteriorly, with mucous râles; the cough was violent, especially at night; appetite very bad; bowels open, from a powder which his mother gave him; and the child had an incessant desire for drink.

Applicentur hirudines vi. temporibus.

℞ Pulveris colchici - - - gr.iii
Hydrargyri chloridi - - gr.i. M.

Fiat pulvis, ter die sumendus.

Farinaceous diet; three ounces every four hours.

10th.—Not better; coughed and hooped very violently

e

ing

xhibited in

have no faith

ative, as digitalis,

e.
on t.
across
fretful, lyin
and his head
the appearance

last night; had two fits; in other respects as yesterday; bowels opened once.

Repetantur pulveres quartâ quâque horâ.

℞ Acidi hydro-cyanici (Scheele's) ♏xxiv
Vini ipecacuanhæ - - - - ʒiss
Aquæ destillatæ - - - - ℥viii. M.

Fiat mistura. Capiat cochlearium magnum quartâ quâque horâ.

11th.—Has not had a fit since yesterday morning; cough much the same; skin cooler; bowels opened twice.

Repetantur omnia.

13th.—Looks pale and languid; skin cool; pulse 96, soft; countenance less anxious; cough better; bowels opened twice daily.

Sumatur pulvis ter quotidie. Repetatur mistura.

16th.—The breathing is very rapid and short; face swollen, and of a blue colour; cough very frequent, but not violent; hoops a great deal; pulse 120, but not full.

Applicentur hirudines vi. thoraci.

℞ Pulv. ipecacuanhæ - - - gr.xvi
Extracti conii - - - - gr.xvi
Aquæ destillatæ - - - - ʒii. M.

Fiat mistura. Capiat cochlearium minimum secundâ quâque horâ.
Repetatur pulvis colchici.

17th.—Breathing deeper and less rapid; countenance less anxious; face less swollen and livid. The medicine made him sick three or four times, afterwards it acted on the bowels.

Repetatur mistura ipecacuanhæ quartis horis. Perstet in usu pulv. colchici.

19th.—Respiration very rapid, with very loud wheezing; face swollen; pulse 160; skin rather hot.

℞ Pulv. ipecacuanhæ - - - - gr.v
Antimonii potassio-tartratis - gr.i. M.

Fiat pulvis, statim sumendus.

℞ Acidi hydro-cyanici (Scheele's) ♏xxiv
Vini ipecacuanhæ - - - - ʒiss
Aquæ destillatæ - - - - - ʒviii. M.

Fiat mistura. Capiat cochlearium magnum secundâ quâque horâ.

20th.—Breathing much relieved by the action of the emetic; now tolerably quiet; cough and whoop troublesome; pulse 100; skin cool; bowels well opened three times.

Repetatur mistura acidi hydro-cyanici.

30th.—The child continued with very little alteration in his symptoms till yesterday, when he had two fits. The cough is rather better, but the whoop has not ceased; eyes very heavy; skin not very hot; pulse 120; bowels open.

Applicentur hirudines vi. temporibus. Repetatur mistura.

℞ Pulv. colchici - - - - gr.iii
Hydrargyri chloridi - - - gr.i. M.

Fiat pulvis, ter die sumendus.

May 2nd.—Has had no fit; seems rather better; cough continues.

Perstet.

From this time the fits came on irregularly every third or fourth day; but when they were over the child did not appear very ill, though his hands and feet occasionally became so stiff that they could not be bent. His cough scarcely abated at all in frequency or violence, and the

whoop never ceased. The use of the colchicum and hydrocyanic acid was persevered in until the 11th of May, on which day, about four o'clock, a violent fit came on, which lasted half an hour. Another very soon followed; and they continued all night with very short intervals. The child lay stretched out so stiff and motionless, except during the convulsions, that several times after a fit his mother thought he had ceased to breathe. The morning, however, finding him still alive, the mother expressed a wish to take him to me, being anxious to leave nothing undone that might be the means of saving his life. Her friends all entreated her to suffer the child to die quietly, and said it was a shame to take him out. But her maternal feeling overcame all obstacles, and she rolled a blanket round him and set out. As she came along, the child had several fits, and every now and then she looked, expecting to see that he was dead. On coming round a corner, a violent gust of wind nearly blew the child out of her arms, but she reached the house in safety. The child presented a most distressing spectacle. He lay across his mother's arms, with his limbs stretched out as stiff as if he had been dead: the thumbs were drawn across the hands; the toes were drawn downwards and inwards; the muscles of the jaws were rigid, and the pulse was rapid and feeble, so far as the repeated twitchings would admit of its being distinguished. My first impulse was to take blood from his head, as I thought it was just possible that doing so might save him. I felt, however, that there was much reason to apprehend that he might die under the operation, and that if he did, I might be accused of killing him. Consideration for my own reputation suggested, "Do not run the risk;" but I could not bear to suffer an infant to die without making

every effort in my power to save it. I therefore told the mother that her child was, as she must see, dying; and said—"Nothing but a desperate measure can save his life, but that measure may possibly kill him; you must therefore decide whether I shall do the only thing which can be done for him, and run the risk." She replied, that she saw her child was dying, and if any thing could give the least hope of saving him she wished that to be done. I immediately opened the temporal artery. He had not lost more than an ounce and a half of blood before he became very pale, the rigidity of the muscles relaxed, and he fell back weak and exhausted. I secured the artery, and the mother took him quietly home, and laid him in bed, where she now and then gave him a tea-spoonful of arrow-root. He scarcely moved the whole day, and slept so quietly through the night that she feared he was dying. He revived a little the next morning, and drank a cup of tea, and in the course of that day took a little broth. The following morning,

13th.—He appeared much stronger, and the cough returned, but it was not violent; the pulse was 100. As a matter of precaution, the following mixture was given:—

℞ Acidi hydro-cyanici (Scheele's) ♏xvi
Aquæ destillatæ - - - - - ʒii. M.

Fiat mistura. Capiat cochlearium parvum quartâ quâque horâ.

14th.—Cough much better; no whoop; pulse 100; head rather hotter than usual; eyes a little dull.

Repetatur mistura.

℞ Pulv. colchici - - - - - gr.ii
Hydrargyri submur. - - - gr.i. M.

Fiat pulvis, ter die sumendus.

He continued the powders and the medicine a week, and on the

22nd.—His cough was slight, not more than he had been accustomed to for many months; he had not whooped, or had any fit; his skin was cool; pulse about 90, soft and feeble; and all appearance of head affection was gone.

Omittatur pulvis colchici. Repetatur mistura ter die.

The mixture was continued, as a matter of prudence rather than of necessity, for a week, at the end of which he appeared perfectly free from disease, but weak. All medicine was omitted, and he went on daily improving until he became a strong boy. He is now in good health.

CASE II.

November 21st, 1834.—I was requested to visit Henry S., aged fifteen months, residing in Wells Street, Oxford Street, but the father said it was merely for his satisfaction he wished me to go, as the child was dying. I found him lying in a cot, with the eyes wide open, the pupils dilated, and unconscious of everything. His mother said he had had hooping-cough violently for several weeks, in the course of which he had several fits; that during the previous week the convulsions had been very frequent, and that he had lain for the last forty-eight hours in the state in which I found him. His pulse was very rapid, but feeble—160; respirations 40; chest tolerably dilated by an inspiration; bowels open; motions not offensive; he had taken no food for some hours; his head was hot, but his skin cool.

℞ Pulv. colchici - - - - gr.ii
Hydrargyri chloridi - - gr.i. M.

Fiat pulvis, quartâ quâque horâ sumendus.

One ounce of blood to be taken from the temples by cupping.

22nd.—The child is sensible; takes a little food; in other respects the same.

Repetatur pulvis.

26th.—Has gone on taking the powders every four hours. He is quite sensible; cries on being moved, and seems very irritable; takes food freely; his pulse is almost countless, and very feeble; his bowels are open twice a day; seems very languid.

Omittantur pulveres.

℞ Ammoniæ sesqui-carb. - - ℈i
Misturæ camphoræ - - - ℥i
Aquæ - - - - - - - - ℥i. M.

Fiat mistura. Capiat cochlearium medium quartis horis.

Farinaceous food; three ounces every four hours.

27th.—Child less languid; pulse 160; bowels opened twice a day; takes food freely; head still hot.

Repetatur mistura ter die.

December 1st.—Has gone on with little alteration in his symptoms since the last report. He seems drowsy and fretful to-day; head hot; eye very anxious; pulse 160.

Repetatur pulv. colchici quartis horis.

2nd.—Head cool; expression of the eyes more quiet; slept tranquilly in the night; bowels open; pulse 150.

Repetatur pulvis, ter die.

4th.—Head cool; appearance of the child much better; pulse 140; bowels open.

Omittantur pulveres. Capiat olei ricini ℥ii pro re natâ.

After this date the child went on gradually improving, without the recurrence of any unfavourable symptoms. His strength increased daily; and about the middle of December he was well enough to be taken out.

These are the only cases of hooping-cough complicated with convulsions in which I have had an opportunity of making a fair trial of remedies. I have been called in to several other children affected in a similar way, but the disease had reached such an advanced stage that they died within twenty-four hours after I had seen them, and therefore I do not insert their cases here.

The first case is a very striking one. It will be observed that for several weeks the cough and whoop continued in spite of hydro-cyanic acid and colchicum, and was scarcely, if at all, affected by their exhibition, and that they never yielded to remedies until the head was relieved; but that when the disease of the brain was subdued, they were speedily cured. The effect upon this child of the abstraction of so small a quantity of blood as an ounce and a half was very surprising; and the result of the treatment affords an impressive lesson to us all, never to abandon any one so long as a possibility remains of affording him relief, nor to suffer our practice, *in such extreme cases*, to be influenced by any apprehension which we may be tempted, *for our own sake*, to entertain of its results. I have met with instances where a child has lain in a state of insensibility for two days, with the pupils of its eyes very widely dilated, tossing its legs and arms about, and passing its motions unconsciously, and has recovered after all. We ought, therefore, to bear in mind that affections of the

brain, even after hooping-cough, are often curable, if treated with an energy proportioned to the severity of the symptoms and the danger of the condition in which the patient is found. But violent remedies should never be used unless we are sure that milder measures will fail in producing the required effect.

It may be a matter of doubt whether the affection in each of these cases is to be pronounced hydrocephalus or not. In the second, I think it was such; in the first, it may, perhaps, be said to have been inflammation of the membranes preparatory to effusion. But although it is desirable, in a scientific point of view, to determine, if possible, the difference between the symptoms which indicate effusion into the cavities of the brain, and those which are produced by inflammation of its membranes, it seems of little practical importance:—the same remedies are applicable in both affections, modified according to the circumstances of each particular case.

The complication of disordered bowels, or infantile remittent fever, with hooping-cough requires very few observations, because it cannot be said to be the effect of the violence of the cough, or the result of the disease. The fever is an accidental circumstance, arising from neglect of the child's bowels, or diet, either previously to the attack, or during its continuance. Miss Ellen E. (whose case is given at p. 137) was the only instance of this complication which I ever met with, and her case was not truly one of remittent fever. She had a foul tongue, loss of appetite, and unhealthy evacuations, but not a tumefied ab-

domen. Such a complication is, however, possible; and therefore it may be well just to mention the symptoms which attend it, as described by those who have written upon the subject.

After the continuance for some days of indications of disturbance of the digestive organs, a degree of fever comes on insidiously, sometimes, though rarely, commencing with rigors; the paroxysms of coughing become more frequent, and the breathing is quickened. But an attentive observer will soon perceive that the hurried respiration of this form of fever differs very much from that of inflammation of the lungs. In the fever, it is much quicker at one time than at another, and, on inspiration, the air sometimes enters deeply into the lungs; in the inflammation, the frequency of the respiration is at all times the same, and the physical condition of the respiratory organs prevents them from at any time taking in much air. The absence of the usual symptoms of bronchial inflammation in the loud and forcible respiration of fever tends also to mark the distinction; and the appearance of the evacuations, the coated tongue, the daily remissions, and the picking of the nose and lips, shew the nature of the disease.

In the treatment of this complication, the fever is that which calls for our attention, rather than the original disease. Warm baths—mild diluent diet—purgative medicine, which shall produce three or four evacuations daily —with attention to the symptoms of local congestion as they arise, are the means usually employed; but, as I have not myself had the treatment of any true case of remittent fever during hooping-cough, I must refer my readers to the authors who have written on this form

of complication. I had very extensive opportunities of seeing children in fevers of all kinds when I attended outdoor patients at the Surrey Dispensary; and yet I can say, that cases of true remittent fever were of very unfrequent occurrence. Cases of fever were very frequent; but this form of it is so very peculiar that it cannot be confounded with the common fevers of children; and were I to judge from my own experience, I should say, that not one case in twenty of those which are called remittent fever ought properly to be classed under that head.

CHAPTER XII.

GENERAL RULES FOR THE TREATMENT OF HOOPING-COUGH.

Atmosphere.—As hooping-cough is much more severe in winter than in summer, it is obvious that the inhalation of cold air, and chilling of the surface of the body, ought to be avoided, as being very injurious to persons affected with this complaint. Every medical practitioner has observed the comparatively trifling effect which the most appropriate remedies produce upon catarrhs, asthmas, and all affections of the mucous membrane of the bronchiæ, unless care be at the same time taken that those who are suffering under them breathe warm air, and preserve their bodies of a comfortable temperature. Even when they are in a state of convalescence from these disorders, the momentary inhalation of cold air, or temporary exposure to a strong draught, will often reproduce them. Children attacked with hooping-cough are similarly affected by the same causes; the temperature of the air which they breathe, and the warmth of their clothing, are therefore points of great importance in their treatment. In cold weather they should be confined to their nursery and bed-room, in which the thermometer should stand at about 65 degrees of

Fahrenheit. This degree of heat can only be kept up by having fires night and day in both apartments. The bedroom should be ventilated in the day time, and the nursery at night, by leaving the doors open; but whilst the children are in them, draughts of air should be carefully avoided.

Clothing.—When the weather is very cold, children ought to be covered with fleecy-hosiery, or flannel, up to the neck and down to the wrists; and in summer with calico in addition to their usual dress. Under no circumstances should their arms and chests be left exposed, as is generally done by the present mode of dress. It is scarcely possible to keep a room so warm and so free from draughts as to prevent any part of the body which is uncovered from being chilled. The blueness of face and elevation of the papillæ of the skin, commonly called goose-skin, which are always seen in children improperly clothed, evidently shew that the blood is repelled from the surface, and determined to the internal organs; and if any one of them be affected by disease in ever so slight a degree, to that one the determination will always be specially directed. Accordingly, when children suffering under hooping-cough are allowed to be chilled, the blood will be determined to the lungs, they being the organ most affected by the disease. It is very difficult indeed in cold weather to cure even a common catarrh, unless the body be kept very warm; for if it be chilly, medicine will produce little or no effect. But a cold will be cut short almost immediately if the patient remain in bed, because by that means he is surrounded by an exceedingly warm atmosphere, and it becomes almost impossible that a chill should take place.

The course which hooping-cough runs is generally of so

long a duration, that in the early stage it is most important, in order to remove as speedily as possible the bronchial affection, to adopt every measure calculated to advance that object. Children are so apt to throw off the bed-clothes, that they ought to wear in winter, thick flannel night-dresses, and warm calico ones in summer; it would also be desirable to tie the bed-clothes to the corners of the bedstead. Their feet should be kept particularly warm, for when that part is cold there must also be a deficiency of warmth in the rest of the body. This may be done by making them wear woollen stockings, and thick-soled shoes. If children be permitted to wear slippers, or light shoes, their feet must be cold, whether the weather be so or not; for the interposition of merely a thin sole between the feet and the floor permits caloric to pass off so rapidly from the body, that chilling of the extremities is sure to take place. If the floors be not close, they should be carpeted, unless the rooms are very conducive to warmth in other respects.

Bathing.—In hot weather, when the skin is relaxed, a warm bath produces too much perspiration, and weakens the system; but when the skin is dry and chilly, through the coldness of the atmosphere, immersion in warm water for about ten minutes not only restores it to a healthy condition, but communicates to the body a beneficial degree of heat, which lasts for some days. In winter, therefore, a hot bath becomes a most important auxiliary, and may be used twice or thrice a week with advantage. If catarrh take place in the progress of the disease, warm bathing should be resorted to immediately; unless, as happens in the later stages, the system be very much enfeebled, when it may prove injurious. The water should be heated to about 98 degrees of Fahrenheit in cold weather, and 96 in warm,—which, in

case a thermometer cannot be obtained, it may be useful to know, is about the temperature which the open eye, or any part of the body that is usually covered, will, on being immersed, conveniently bear. Cold baths are, generally speaking, altogether inadmissible. But in cases where the duration of this disease has been protracted, and the cough is kept up solely by the debility of the patient, sea-bathing may be found a useful remedy.

Diet.—There is nothing of greater importance in the treatment of this disease than attention to diet. If a child be allowed to take a hearty meal of even the lightest food, or a small quantity of that which is solid and indigestible, the cough is invariably increased, and sometimes fever, with great general excitement, is produced.

In most cases of acute bronchial affection it is well known that food which is improper either in quantity or quality will almost immediately aggravate the cough. It does so in two ways; first, by determining an increased quantity of blood to the mucous membrane of the bronchiæ, which promotes irritation; and secondly, by distending the stomach with the gas which is evolved from it through imperfect digestion, whereby the diaphragm is forced upwards against the lungs,—a condition which, even in the absence of disease, causes a constant inclination to cough. Difficulty of breathing arising from this state of the stomach occurs more frequently than is generally supposed. In weakly habits, improper food causes such distension of the intestines with gas, that drawing a full inspiration produces acute pain under the ribs, and respiration is greatly impeded. To such an extent is this the case, that inexperienced practitioners imagine these symptoms to be indicative of pleurisy. Bleeding to faintness, the most successful remedy

for inflammation of the serous membrane, is accordingly had recourse to. The pain is relieved by loss of blood,—why, I cannot understand,—but it very soon returns with the same intensity, and the same means of relief is again adopted. I have known these symptoms to recur so many times, and the same treatment to be repeated so often, that the loss of blood has been carried to the extent of several pints, and the patient's life endangered from excessive debility. The blood drawn in those cases was more buffed and cupped at each succeeding bleeding than at the preceding one; yet ultimately the pain was removed by castor oil, brandy, and carbonate of soda, because they removed the cause of it—acidity and flatulence.

At the early stage of the disease, children should be restricted to a light farinaceous, or vegetable, diet. When the bronchial symptoms are severe, prepared-barley gruel, arrow-root, sago, and such diet, in a liquid form, should be the only food. The quantity for an infant at any one time should not exceed three ounces, which may be given once in three hours; and infants who are suckled should never have the breast more than once in a similar period. Four ounces may be given to children above two years of age every fourth hour. When the breathing is not oppressed, the diet should consist of the same things, but in a more solid form, as light puddings, made of ground rice, bread, batter, tapioca, &c.; mutton-broth thickened with barley may also be allowed; but meat, pastry, cheese, and beer of any kind, should be carefully avoided. Tea or coffee, with thin toasted bread devoid of butter, may be given morning and evening. But, whatever be the food, the quantity should never exceed at any meal three ounces for an infant, and four for persons of any age. If this rule be adhered

to, digestion will go on without any constitutional disturbance, and no distention of the stomach with gas will take place.

With each dose of medicine a small quantity of mucilaginous drink—about an ounce at a time—may be given, as hot as can conveniently be swallowed, which will keep up a warm and perspiring condition of the skin, and greatly facilitate the expectoration.

When the cough becomes trifling, animal broths may be substituted for farinaceous food, but in the same proportions; and if the child appear weak, small quantities of animal food may be given every second day, *instead* of any other diet; but *not in addition* to it, for nothing is more apt to reproduce the cough than an attempt to build up the strength of children too fast by nutriment. When they appear light and cheerful after a meal, sleeping soundly, and remaining cool and free from thirst during the night and the next day, we may be satisfied that the indulgence has not been granted too early, nor carried to too great an extent.

The nature and progress of hooping-cough which it was proposed to investigate have now been considered, the several diseases with which it may become complicated in its course have been pointed out, and the extreme danger attendant upon them has also been shewn. The various remedies which have been generally used for its treatment by different practitioners have been enumerated, and it has been seen what little power the greater part of them are, by their respective advocates, supposed to possess of cutting short this violent disorder, and effecting its

speedy cure. Up to this moment hooping-cough is acknowledged, with almost unanimous consent, to be a complaint which will run its lengthened course, whatever be the remedies with which it is opposed; but after the numerous examples which have been given of the efficacy of hydro-cyanic acid, I trust sufficient reason has been shewn for not assenting to this discouraging conclusion, and for laying before my professional brethren and the public the result of my experience.

Had the treatment of hooping-cough been a matter merely involving theoretical considerations of no substantial importance to society, I should have been satisfied at this point to have withdrawn from the subject; but it stands connected with topics of deep practical interest to the community at large. It has appeared incidentally, in discussing the best mode of treating this disease, that the liability to those complications which constitute its principal source of danger is very much greater in children who have been previously managed improperly, than in those whose constitution has been well formed by judicious treatment; and the experience of every medical man must have led him to remark how frequently and materially the accession of the complicated forms of the disease is facilitated, and their ravages are promoted, by some condition of body attributable to improper management in the early stages of life. In giving advice to from forty to fifty poor children weekly at my own house, coupled with the ordinary opportunities which my profession has afforded me of observing the manner in which children of every rank are brought up, I have been furnished with abundant and lamentable proof, that parents and nurses in general are so very ignorant of the right mode of rearing infants, that the growth of the

population must be seriously affected by it, and the standard of general health much reduced. These considerations shew the necessity of impressing upon the minds of parents the importance of attending strictly to those rules for the management of their children which are essential to the establishment of a sound constitution, a healthy body, and a vigorous mind. There can be no doubt that, by a more rational system than that which so generally prevails, the constitutions of children might be rendered more capable of resisting the attack of diseases in general, and of overcoming them when attacked, than they are at present; and I believe that many who have the charge of children would willingly pursue a wiser course, if it were set before them in a practical form. From these motives I am induced to subjoin, by way of Appendix, some hints for the management of children, which are calculated, on the one hand, to remove many of the erroneous notions which exist on this subject, and alter the injurious practices to which they give rise; and on the other, to convey to those who desire it, such information as may enable them to fulfil their duties towards their children with comparative ease and comfort to themselves, as well as with permanent advantage to the tender objects upon which their pains, solicitude, and attention are bestowed.

THE END.

APPENDIX.

HINTS

ON

THE GENERAL MANAGEMENT OF CHILDREN

DURING

THE PERIOD OF INFANCY.

ON THE GENERAL MANAGEMENT

OF

CHILDREN.

SECTION I.

MANAGEMENT OF A CHILD IMMEDIATELY AFTER BIRTH.

A PLANT which is removed from its native land into a foreign climate, requires for the preservation of its life the most careful assimilation of atmosphere, temperature, and soil, to those which it enjoyed in its own home: but a child when it enters into the world bears with impunity a more sudden and greater change, not only of the temperature in which it has lived, but also of the food by which it is to be nourished. Accustomed to the heat of 100 degrees of Fahrenheit, it finds itself in a moment surrounded by an atmosphere of, it may be, 40 or 50 degrees; and no doubt this transition from heat to cold would have proved fatal, had not the wisdom of the Creator appointed that at that moment a new function should be developed, by which so much heat is generated, that, if it be prevented from passing off by surrounding the body with that kind of clothing which is a good non-conductor, the internal temperature will be effectually preserved. In its previous state of existence it has derived its nutriment literally from its mother's blood; it is now called upon to convert into blood, for its own support, its mother's milk.

Its earliest claims, therefore, upon our sympathy and assistance are, to be preserved from cold, and to be supplied with food. Its peculiar situation after birth requires, however, some attention. When a child has been separated from its mother, it should be wrapped in flannel,—a sufficient opening being left to allow it to breathe freely,—and be laid in bed, or in some warm place, until the nurse has time to attend to it. It must then be carefully washed. The face and eyes should be cleansed with warm water and a sponge or soft linen ; but soap and flannel will generally be required to remove from the body that white, pasty secretion with which it is covered; if it adhere very firmly to any part, it is better to allow it to remain to be removed by succeeding washings, than to use any degree of force, lest it should injure the infant's tender skin. Great care must be taken to prevent the soap and water from getting into the eyes, and to ensure that every part of the skin is perfectly dried with a very fine cloth.

The navel-string must next be separated from the child's skin by having a bit of soft, singed, linen rag wrapped round it; it is to be laid afterwards on the stomach, and kept in its place by a soft roller passed loosely round the body.

The infant is now to be clothed. It might naturally be expected that the dress prepared for a newly-born child should be constructed so as to be put on with the greatest ease, and be of such a quality as to preserve the body warm, and protect it from contact with the air, the powers of life being so feeble that a chill is produced by the slightest exposure to cold; but this is far from being the case. On the contrary, a baby's dress is almost always studiously complicated. It was the custom until very

lately to put on a double flannel cap, in order to keep the head warm, and many nurses still persevere in doing so; but the head of a child is so abundantly supplied with blood, that it is enabled to resist the effects of cold better than any other part of the body. A single cap is therefore quite sufficient; and indeed, nature seems to point out, by clothing the head with hair, that much artificial covering is unnecessary. The next step is to draw over the child a shirt, stays, petticoat, and frock, and through the arm-holes of each of these separate garments the arms have to be pulled. As the child cannot sit up, or support itself in the least, it must be turned from its back to its face, and from its face to its back, several times during the operation of dressing, which irritates it exceedingly, and causes it to cry the whole time. The body is thus unnecessarily exposed for a considerable period, and the limbs are subjected to a roughness of treatment which is ill suited to their soft and delicate structure. All this might be obviated by having a dress properly made. The best material for preserving the heat of the body is flannel or fleecy hosiery; but as they are too irritating for the tender skin of a child, fine linen may be interposed between either of them and the body; and over both may be placed a frock; but they should all be made open the whole way down the back, and should lap over sufficiently to prevent the entrance of air; they should be high enough to reach up to the chin; the sleeves of each garment should be drawn one inside of the other, so that the whole dress may be put on at once, by merely laying the child upon it, and putting its arms through all the arm-holes together. The use of pins may be superseded by fastening the dress with strings, and placing a broad, soft

belt around it. By these means the business of dressing is accomplished in a very few minutes, and all the evils which have been described are avoided. When dressed, the child should be laid in bed, as it is a matter of the greatest importance that it be kept exceedingly warm.

It is customary soon after a child is born to give it medicine, and also food; but *neither* of them is *necessary*, and they are *both unnatural*. The intention of the medicine is to clear the bowels of the meconium, or dark green secretion, with which they are filled; but it is impossible to conceive that an all-wise God, who fits everything He creates for the circumstances in which He is about to place it, should permit a child to enter the world filled with a substance necessary to its health in the former, but injurious in the present, stage of its existence, without having provided some *natural* means for its removal. The intestines of the young of the brute creation are filled with a similar secretion, yet they require no medicine for its expulsion, nor any human interference to prepare them for the new food upon which they are to live; the *natural* remedy provided for all young animals immediately after birth is their mother's milk, which is at that time very different in colour, consistence, and chemical qualities, from that which it afterwards becomes; its effect upon them is slightly aperient, purging them gently whilst it nourishes them, and thus the meconium is gradually expelled. The practice of giving children medicine would therefore appear to be unnecessary, and I believe it to be injurious, unless particular circumstances arise to require it. Let no medicine be given, but let the infant be applied as early as possible to its mother's breast; and in proportion as its intestines become filled with milk the meconium will pass away.

A few hours after birth, an infant is usually fed with panado, and the reason assigned for doing so is, that, as the secretion of the mother's milk does not take place in some cases till the second or third day after parturition, children will require support during that period; and custom has now rendered this ridiculous practice so universal, that infants are not put to the breast till they are two or three days old, and food is given to them even when their mother has sufficient milk for their nourishment. Now, is it not reasonable to suppose, that if children required food at this early period, healthy mothers would be provided with what was necessary for them? The secretion of milk is late in some animals and early in others, but their young do not seem to suffer from the delay; these, in reality, bring their nourishment into the world with them, for the meconium is intended to afford the young animal nutriment until his natural food is prepared. The stomach at that period is not yet fit for any other food than that which nature has provided, and art cannot produce any diet bearing such an affinity to milk as to render it proper for the tender bowels of a new-born child. If it should happen that the milk does not flow so soon as it is expected, let the child be put to the breast again and again; very little nourishment will at present suffice, and that will generally be obtained from the nipple; if it cannot, a little warm milk and water, sweetened with sugar, is the only nourishment proper to be given.

The tardy application of the infant to the breast is injurious to the mother, as well as to the child. If it be not applied before the third day, the breast becomes swollen, the nipple drawn in, and nursing becomes difficult and painful; the extreme distention of the milk vessels of this

delicate and sensitive gland speedily produces inflammation, which generally terminates in the formation of an abscess of the most painful kind; on the other hand, if the child be applied very early to the breast, the milk will be drawn off as fast as it is secreted, and by this means an accumulation of it will be prevented, and neither abscess nor fever will take place.

Generally, after delivery, both the mother and child fall into a sweet and refreshing sleep, during which time the milk vessels of the breast are dilating; the child when he awakes will eagerly seek the nipple, and encourage a more plentiful supply. There may be some difficulty with the first child, but it is rendered still greater by keeping him away, perhaps two or three days, from the mother, and suffering her attendants to draw her breasts, which generally occasions sore nipples. The gentle, easy, and frequent suction of an infant, will not only prevent this inconvenience, but gradually excite the milk, and thereby relieve the mother from a troublesome burden; and the nipples will by this means be drawn out, so that the child can suck without further difficulty. Our wisdom is to follow nature, not to lead her; the young of every animal, by a natural instinct, seek their mother's milk as soon as they are born. Can any reason be assigned why their example should not be followed, and the child applied as early as possible to its mother's breast?

Many evils result from giving food to an infant, and thus interfering with the order of nature. The stomach is filled with a substance by no means easy of digestion, and very unlike in quality to that which is designed for its support; the appetite is so cloyed that the child is very unwilling to take the breast afterwards; and the symptoms of

an oppressed, deranged stomach are speedily manifested by the appearance of an eruption commonly called "red gum." The most judicious course to pursue with a new-born infant is to give him neither medicine nor food, but to wait patiently till the secretion of milk takes place in the mother's breast, which usually commences on the second, and becomes more perfect on the third, day; but all the best writers on the management of children agree in the opinion, that the child of a healthy mother will not be injured by waiting for its natural food, even though three whole days should elapse before it is prepared.

SECTION II.

WHAT IS THE PROPER FOOD FOR CHILDREN?

It is obviously the intention of God that the young of all mammiferous animals should, until they are furnished with an apparatus for preparing their own food, be fed upon their mother's milk, for every young animal seeks it with instinctive eagerness as soon as it is born. Now if man be not exempted from conformity to this law, how can the most sceptical person question what is the proper food for children? Assuredly their mother's milk must be; and this conclusion is confirmed, not only by analogy, but also by experience, for a much greater number of children who are fed by hand die in infancy, than of those who are suckled.

It is argued by some persons, that many of the strongest and healthiest children have been brought up by hand. This is true, but what does it prove?—simply that they possessed such vigorous constitutions as to be able to convert unnatural food to their own nutriment. The question is not, however, whether some children may not live,

and even thrive, who are brought up by hand, but, upon what kind of food do they generally thrive best? Dr. Struve states, that more than one half of the infants who were entrusted to the care of dry-nurses died before they had attained their third year. Fourcroy, on the other hand, confirms this testimony by assuring us that, of a hundred children who were suckled not one lost its life during infancy. Dr. Merriman, in his edition of Dr. Underwood's *Treatise on the Diseases of Children*, says, that he is convinced the attempt to bring up children by hand in London proves fatal to at least *seven* out of *eight* children, and that this happens whether the children have been fed from the moment of their birth, or after having been suckled for three or four weeks. In the country, the mortality amongst dry-nursed children is not quite so great; but it would be sufficient to deter parents from making the attempt to bring them up in this manner if they were aware of the risk to which they expose them in doing so. Let the appearance of a child suckled by a healthy woman be compared with that of one who is deprived of the food which nature provided for him, and is brought up by hand: the skin of the one is plump and ruddy, the limbs well rounded, countenance cheerful, eyes bright, and happiness is expressed in his look; the skin of the other is shrunk, pale, shrivelled, his limbs are emaciated, abdomen large, eyes dull and heavy, and his countenance expressive of fretfulness and misery.

Now this is just what might be expected. The various qualities of different kinds of milk justify the inference that what is fit for the nourishment of the young of one animal may be unfit for those of another; and if milk of an improper quality disagrees with a young animal,

much more may we expect substances in no way similar to milk to do so with an infant.

Seeing, therefore, that we have the analogy of nature, the result of experience, and the evidence of men of great respectability and practice in their profession, to prove that the only food which is proper for an infant is a woman's milk, it is clear that no mother can be justified in attempting to bring up her children by hand, unless she is unable either to suckle them herself, or hire a wet-nurse for them.

Should straitened circumstances, however, or any other unavoidable or lawful cause, prevent a mother who cannot suckle her child from providing it with a wet-nurse, let her commence to feed it without fear, in the confidence that the same Providence which permitted her to be brought into such straits will support her in the performance of her arduous task, and bring her safely through it; but let her know that her child must of necessity be exposed to great peril by the attempt, and therefore that it is her duty to feed him at those times, and with those substances, which experience has proved to be most calculated to preserve a child in health.

SECTION III.

SHOULD A WOMAN SUCKLE HER OWN CHILD?

If it be admitted that the proper food for an infant is a woman's milk, it requires little consideration to decide that a woman should suckle her own child. The milk with which the breasts of every mother are distended soon after parturition is, no doubt, designed for the nourishment of her offspring, for it is found to agree better with her own, than with any other, child. "So much," says Mr. Newnham,

"does this vital fluid partake of the peculiarities of the maternal system, and such a relation does it bear to, and such an assimilation does it possess with, that infantile frame that has hitherto derived its growth and development from it, that it will agree with a child much better than that of an apparently equally healthy nurse." It is clear, therefore, that a regard for the health of her child, and a proper sense of her own duty, render it imperative upon a woman to suckle her own child. It does not however follow that, because it is a mother's natural duty to be a nurse to her own child, she should, as a matter of course, undertake the performance of it; for if her constitution be weak, or her health have been sacrificed to previous indulgence or bad habits, the attempt to nurse will be attended with danger both to her own life, and that of her infant. Few circumstances more frequently give rise to consumption in weakly women, than nursing their children when their bodily frame is not vigorous enough to secrete a sufficient quantity of milk for the purpose. Ladies who live in London experience great difficulty in suckling their children; but as females of the lower classes make good nurses, even under the disadvantages of the close air of a city, the cause of ladies failing to do so cannot be attributed to a residence in London, but to a difference in their habits of living. Poor women take a great deal of exercise in the open air; they go to bed, and rise, early; they live upon a diet which is not too nutritious for the labour they have to perform;—whereas ladies use very little bodily exercise; expose themselves scarcely at all to the open air; indulge themselves in late hours; spend the greater part of the night in going from one heated room to another; and live almost habi-

tually upon improper food. As a natural consequence, their limbs diminish in size and power; their freshness of colour disappears; their digestive organs become weak, and refuse to perform their functions; and their appetite becomes languid and capricious, refusing wholesome and nutritious food—for real hunger will never be felt if the materials of the body be not sufficiently expended in active exercise to render a supply of nourishment necessary. The exhausted frame of a woman who has lived in this manner will either be unable to furnish the necessary quantity of milk to feed an infant, or will secrete such as is not of a quality proper for its support. To ladies in such a state of health, nursing is dangerous, and it should not be attempted by them; but delicacy of frame or constitution, from whatever cause it may have been induced, unfits a woman for being a nurse. Weakly ladies may, however, often suckle their children, provided they will be attentive to every thing which conduces to improve their own health; but those whose debility is dependent upon some dormant morbid action of the system which may be roused into activity by the process of lactation, should not nurse, as they may probably produce a similar morbid agency in the constitution of the infant. No female, therefore, who has a tendency to consumption, or scrofula, or whose person is much emaciated, should think of suckling a child; nor should any mother persevere in doing so when she feels her strength beginning to decline.

Another powerful reason which ought to dissuade all weakly women from suckling is, that they are literally, though unintentionally, the cause of starving children to death. The quality of a woman's milk depends so much upon the state of her health, that if she be feeble or

languid her milk will be poor and watery, and though the child will take it greedily, he will shew by his whining and crying that he is not satisfied; by degrees he will lose his colour and flesh, and will soon fall into a state of atrophy, from which nothing can extricate him but the milk of a healthy woman. I have seen children attacked with convulsions, merely from the poverty of the milk upon which they were living; and the cure of the fits, and the restoration of the children to health, were effected by procuring for them proper nurses. Many women feel a strong desire to perform the part of nurse to their own children, and are exceedingly unwilling to permit another to take their place. Some, and those not a few, openly declare that they would suffer their children to die rather than allow them to live upon the milk of another woman; but mothers should remember that if they attempt this duty when they are not in a condition to perform it, they are not only deliberately sacrificing the health, and probably the life, of their children, to the gratification of their own feelings, but are guilty of a suicidal act, for which they must ultimately give an account.

On the other hand, nothing should deter a healthy woman from performing the part of nurse to her own child. If the impulse of nature be not a sufficient inducement, a selfish motive may be adduced, which is, that the process of lactation is undoubtedly most beneficial to females, and that those who suckle their children are much less subject to cancer than those who do not. It requires, however, no small degree of self-denial on the part of a woman who has been accustomed to indulgence, to confine herself strictly to that mode of living which is pointed out by common sense, and which experience has proved to be most conducive to

health; but a woman is bound by what she owes to her offspring to prepare her animal frame by every means within her power for the secretion of healthy milk. During the whole period of utero-gestation she ought to rise and go to bed early, and take walking exercise regularly before each meal; to live upon plain, wholesome, nutritious food, in small quantities, and avoid stimulating liquors of all kinds; and she should be clothed warmly, so as to keep the feet, hands, and surface of the body always at a comfortable temperature. If she will steadily act upon this system, her suffering will be much less in the time of labour, and she will be well prepared for becoming a healthy nurse.

It may be laid down as an axiom, that every woman whose body is sufficiently nourished, and who is free from disease, can, if she please, suckle her child. It is necessary to make this broad statement because we frequently meet with ladies who are fat, of a short stature, and in good health, who nevertheless assure us they are unable to do so from want of milk; they are little aware that this deficiency in the mammary secretion arises, not from weakness of constitution, but from indulgence in indolent habits, from taking too much food, or from mismanagement of the child. The accumulation of fat is by no means an evidence of health, but it is a proof that the system has received a superabundance of nutriment, from which it is attempting to relieve itself by the deposition of this substance. It is well known that animals lose their milk if they grow fat while suckling their young; and precisely the same thing takes place in our own species; but it may be prevented by being very little in bed, by taking no more food and drink than is necessary for the support of the body, and by using as much exercise in the open air as pos-

sible, without fatigue. Nurses should also be aware that the due secretion of milk may be hindered by giving the breast to the child too frequently: the gland must have rest, as well as every other part of the body; and time must be allowed to it to prepare its proper secretions. A woman may go on for some time suckling her child, and afterwards find that her milk is gone. I have in my mind, at this moment, a lady coming under this description by whom I was lately consulted, who assured me she never had been able to persevere long in suckling her children. On inquiring, I found that she habitually spent a long time in bed, took little exercise out of doors, lived well, ate whenever she felt a craving for food, and gave the child the breast whenever it cried. I advised her to change her habits altogether, and gave her a hope that if she did so she might succeed in nursing her present infant. She took my advice, and is now going on very well. It is not necessary for every woman to subject herself to the same discipline; but every mother who is really desirous of performing the important office of nurse to her children, ought to make up her mind to give up all improper self-indulgence, and follow those rules for securing her health which are consistent with rational principles, and which will be found in the section on the proper regimen for a nurse.

SECTION IV.

ON THE CHOICE OF A WET-NURSE.

The choice of a wet-nurse is of great importance. If the infant be very young, a nurse should be selected whose child's age is as near as possible to that of the one about to be placed under her care; but if the child to be suckled

be strong, more than two months old, and of a good constitution, the age of the nurse's child is of less consequence. A wet-nurse should be chosen whose age is between twenty and thirty, as that is the period of life in which a woman's milk is found to be of the best quality. She should not be afflicted with any hereditary disease; nor should a woman be chosen for a nurse any of whose near relatives have died of consumption, or suffered from scrofula. She should not be subject to her monthly illness, nor ought she to continue suckling in case it should come on. In person she should be neither fat nor thin; her complexion should not be dark and swarthy, indicating a bilious temperament; neither ought it to be a very clear white and red, because such an appearance of the skin is generally associated with a scrofulous habit; she should possess a strong constitution, resembling as nearly as possible that of the child's mother; her milk should be of a proper quality, and in sufficient quantity; her disposition should be cheerful, active, and kind; and her temper good.

SECTION V.

ON THE REGIMEN PROPER FOR NURSES.

The diet of a nurse, whether she be the mother or a hired servant, is a matter of the greatest consequence, as her milk is materially affected by the quality and quantity of the food upon which she lives. It is a general opinion that nurses should live well, and therefore they eat largely, and drink in proportion. Two meals of meat each day, with two or three pints of porter or ale, besides breakfast, luncheon, and tea, is the usual diet of servants who are nurses; and as they perform little bodily labour, it is no

wonder that such a quantity of food should often prove injurious to them. Many of them, however, bear this high feeding without any sensible inconvenience; but it is no uncommon thing to see them bloated, oppressed, and evidently suffering from excessive plethora. The health of the child also is frequently affected by this state of the nurse, and eruptions appear upon its skin, which can only be effectually cured by lowering the diet of the nurse. A nutritious and abundant diet, however, is necessary, but not a stimulating one; the quantity of fluid taken must be larger than usual, to supply what the child draws from the system, but its quality should depend upon the constitution and habits of the individual. The object is to furnish to the infant a highly animalized fluid, but it does not follow that the most nutrient beverage will enable a nurse to prepare the best milk; indeed, a large proportion of animal food is infinitely better for this purpose than three or four pints of porter, because it will support without stimulating, and produce a good secretion of milk without being followed by exhaustion; whereas if much porter be taken, the stomach will loathe animal food, and indeed food generally. When the system appears to require a larger proportion of fluid than is furnished by the usual allowance,—which may be known by the thirst being distressing, and by the milk being too thick, and small in quantity,—a little white wine—say one wine-glassful—mixed with water, may be taken instead of ale or beer; a light kind is always to be preferred.

As a general rule, the diet of a nurse should not materially differ from that to which she has been previously accustomed. If she have been in the habit of living comfortably, she may take for breakfast and tea half a pint of

tea or coffee, with stale bread or toast, and a little butter; fresh meat may be eaten twice a-day, but a very small quantity of liquid should be taken with it, lest the perfect digestion of the food should be prevented; a quarter of a pint, or at most half a pint, of wine and water, or mild ale, is sufficient. Porter, stout, or strong ale, are often very injurious, and should therefore be avoided as general articles of diet. Mild home-brewed ale, of very moderate strength, or good rennet-whey, may be taken between meals *when thirst is caused by suckling;* the quantity, however, should not exceed a quarter of a pint at one time. Nothing should be eaten between meals, for digestion is perhaps more interrupted by the frequent introduction of food into the stomach than by any other circumstance. The desire to eat frequently arises from a craving sensation which is symptomatic of acidity, not from real hunger, and ought not to be indulged.

Sometimes it will be found that women of very weak stomachs will not bear this diet; the appetite will fail, the skin will become yellow, tongue foul, and bowels confined; persons of this habit should drink at dinner a wine-glassful of white wine with one of water, and the same for supper, instead of ale; and when thirsty between meals, a little whey or gruel, which many females find by experience increases the quantity of their milk as much as porter.

Food which has a tendency to turn acid is not fit for a nurse. Vegetable acids should be avoided, because they generally impart such a quality to the milk as causes griping to the child. Vegetables are said to do the same; but I believe this to be a mistake, and think that a moderate quantity of farinaceous vegetables or pudding, in addition to a moderate portion of meat, is often better than a large

quantity of meat alone. All uncooked vegetables are improper; but there is no objection to such perfectly ripe fruit as is free from acidity.

If a nurse be not very strong, she may take half a pint of milk when she rises in the morning, and the same quantity before she goes to bed at night; this will give her strength without exciting her, and will furnish materials from which the secretion may be prepared. Nothing can be more absurd than the practice in common use amongst nurses of eating and drinking for the *supposed purpose* of producing milk; for so far from its being increased in quantity, or improved in quality, by eating or drinking more than the appetite requires, the contrary is generally observed to be the result. Nurses therefore, like other people, should only eat because they are hungry, and drink because they are thirsty. It may be imprudent to take as much food as the inclination would prompt, but it must be decidedly wrong to take more. The liquids which a nurse should take ought not much to exceed in quantity the milk which she gives to the child; if an infant be suckled six times daily, it will abstract from its nurse about twenty-four ounces in a day and night,—allowing it four ounces at each meal, which is amply sufficient for the stomach of so young a creature,—and its nurse should not drink very much more than this quantity. The greatest care should be taken of the nurse's general health, for the child's sake; her rest should, if possible, not be disturbed at night, for if she be deprived of sufficient sleep, her system cannot prepare that good and perfect milk which would otherwise be produced from the food of the day. This may generally be done by having the child properly trained, and allowing him to sleep in a cot by her side. Sedentary habits and

confinement to the house are very injurious to a nurse, because they interfere with the proper action of the skin. If the circulation of the blood be not kept up by exercise, the small arteries which terminate on the skin do not receive their accustomed supply of blood, and hence the surface of the body becomes pale, and the secretion of milk is diminished. Air and exercise in moderation should be taken; but great fatigue and every kind of excitement should be avoided, as they have the effect of exhausting the system. She should rise and go to bed early, and should take half an hour's walking exercise, at least, in the open air before each meal: by these means, her health will be preserved, and milk of the best quality will be secreted for the child.

If the directions for the management of children which have been given be attended to, wet-nurses may be employed in the customary occupations of female servants with advantage both to their own health and that of the children, and they will have abundance of time for such occupations. Poor women work as hard when they are suckling as at any other time without injuring their children, and so do the females of those savage nations where women do the principal part of the work. There seems, therefore, no reason why all servants who are nurses should not do the same.

A shower-bath is very useful in strengthening the system of a nurse, and increasing the tone of the blood-vessels and nerves of the skin. The water should be used warm at first, and its temperature gradually lowered until it reaches sixty degrees of Fahrenheit, at which point it should remain; and still more benefit and comfort will be derived from the bath, if, on leaving it, the body be well rubbed with coarse towels, or a flesh-brush.

Nurses ought to be careful not to suckle their children while under the influence of violent passion of any kind, for it is quite impossible but that the milk secreted at such times should be so imbued with injurious properties as to produce mischievous effects.

SECTION VI.

ON THE MANNER OF NURSING CHILDREN.

When a child is dressed for the first time, it should be placed in a warm cot, and not be taken out of it except when it requires to be fed, washed, or dressed. The first question respecting its management which has to be considered is—

How often ought a child to take nourishment? The custom which generally prevails at present is to suckle it as often as it cries; but this practice is most prejudicial to its health. The stomach of the human species, whether young or old, requires a certain time to digest food; and if before that process is finished, more is introduced, it will either be rejected at once, as it often is, by vomiting, or the whole contents of the stomach will be converted into a crude mass, by no means fit for the support and nourishment of the human frame. As a natural consequence, the breath will become sour, and the abdomen will be distended with flatulence. Every organ of the body requires an alternation of activity and repose, and becomes feeble in the proportion in which it is over-exercised. The stomach therefore needs a period of rest after having been exercised upon food. Nurses have a notion that a child cries only when it is hungry; but its uneasiness is generally occasioned by indigestion. It is first over-fed, then rocked into an uneasy

sleep, on awaking from which it is fed again, and again rocked into a sleep more uneasy than the former and of shorter duration,—for the pain caused by acidity and distention of the stomach with flatus awakens it from its slumber; and uneasiness, not hunger, is the occasion of its cries.

Many children, it may be said, thrive and grow fat upon this system. But even were this admitted to be the fact, it would merely shew the strength of their constitution and digestive powers, and not by any means prove the propriety of the present mode of treatment. Besides, the accumulation of fat is not more an evidence of health in a child than in a grown person, and it is very generally accompanied by some defect in the circulatory and absorbent functions. If a child be too frequently suckled, it will always either become fat and bloated or else thin and wasted; and both these conditions are to be avoided. The argument usually advanced in favour of feeding a child as often as it will take food is, that the young of other animals are in the habit of satisfying their hunger as often as it is felt. I believe that children who have not been brought into bad habits may be allowed to do the same, for they will not look for more food until they have digested what they have already taken; but the present system being to meet every indication of dissatisfaction on the part of the child by giving him the breast, he is thus taught to expect it very often without really wanting it, and to take a great deal more than enough at a time; and there cannot be a doubt that children would be much more injured than they are by being too frequently suckled, were it not that their stomachs rejected by vomiting, so often as they do, the milk that is in excess, making it manifest that they cannot bear so

much food; yet, strange to say, this is regarded as a sign of health! A child does not require to be suckled more frequently than once in every three or four hours; and if from his very birth he be applied to the breast at the shorter intervals only, his health will be greatly promoted by it, and he will lie either sleeping quietly, or looking about happy and contented, till the hour of feeding arrives. By this means mothers and nurses will be saved from the unnecessary slavery which makes the employment of nursing the occupation of their whole time. I have had the most delicate children under my care, whose bodily frames were thin and weak, and whose constitutions required all the support that could be given to them, and have found this system of management agree with them perfectly. If a healthy child looks for food soon after he has been suckled, and shews by his manner that he is not satisfied, it is a sure sign that the milk of the nurse does not afford him sufficient nutriment, and is not good; and it should therefore be changed. The child should not be suckled immediately after its nurse has taken a meal, as her digestion is then going on; about an hour, or an hour and a half, after eating is the best time.

Infants swallow a certain quantity of air with their food, which they should be induced to throw up by being gently rubbed upon the back immediately after sucking, and leaned rather forward on the nurse's hand.

The custom of keeping a child at the breast all night, after being fed regularly during the day, is erroneous and absurd. It counteracts the operations of nature, by preventing the powers of the body from being exerted in a proper manner upon the food already received, and deprives both child and nurse of their proper rest. The stomach and bowels are thus enfeebled and rendered incapable of

obtaining that wholesome nourishment which a child would otherwise derive from his food. That the stomach should sometimes be at rest is as necessary to health, as is sleep to revive the exhausted powers of the body. Let an adult, as Mr. Newnham pointedly expresses it, with the strongest digestive powers, only make the experiment,—let him take, to the extent of repletion, food as often as it is generally given to an infant; and in order to complete the parallel, let him use as much exercise as he is capable of, in order to set against the growth of the child; and let him say if he can continue this system for one week only, without suffering from indigestion. But if nature, with all her wonderful resources in full operation, cannot bear this mode of excessive nutrition, how injurious must be its influence upon the feeble organs of infancy!

It will be urged by some mothers that it is impossible to keep children quiet and at rest during the night, and that they will cry for food; but I know from pretty extensive experience that this is not the case, for very few children who are managed properly will be found troublesome at night. The reason why they do not sleep is, that they are labouring under pain and griping occasioned by an improper diet;—it is their uneasiness and suffering that are indicated by their cries.

Partly for their own sake, and partly from a mistaken notion that infants only cry when they want food, nurses are in the habit of cramming them until they are gorged; and as food takes off that sensibility of the stomach which was giving them pain, they eagerly devour whatever is given to them. By this wrong management many children are brought into a state of disease; ulceration of the mucous membrane of the intestines often takes place, or the seeds of

a bad constitution are sown, which too frequently grow up with them into after-life. The best plan is, to put a child to bed at seven o'clock in the evening, after having been washed, dressed, and nursed. He will sleep till eleven o'clock, when he should be taken up, whether he be awake or not, and be suckled with as little disturbance as possible; he should then be laid down again, and in all probability he will not awake before morning; but if he should do so in less than an interval of four hours he ought to be made to go to sleep again without being suckled, for he cannot be in need of food, and if granted as an indulgence it would only lead to bad habits. If these observations be correct, it follows as a matter of course, that the practice of allowing a child to spend the greater part of the night in sucking is highly improper. For this reason alone it ought never to be allowed to sleep with its nurse; it should be placed in a small cot by her side, with clothing suitable to the season of the year, remembering that infants require a great deal of warmth. But there are other strong reasons why infants should sleep alone. Very serious accidents have happened from allowing them to sleep in the same bed with the nurse. Many instances have occurred where the nurse, having put the child to the breast to stop its crying, has fallen asleep, and the child has been smothered by her forgetting it altogether, rolling over, and lying upon it. When a child sleeps with its nurse, it sucks itself to sleep, and then lies, sucking and wetting itself the whole night, and in the morning it is found in a deplorable condition. By this means bad habits are formed, and a child can with difficulty be trained to be cleanly afterwards.

Feeding a suckling.—It is very much the custom to *feed*

children in part even from their birth, and this is done partly to prevent the mother from suffering too great exhaustion, and partly to afford nourishment to the child; but if a woman is not able to suckle a child once in three hours during the day, she is unfit to perform the part of a nurse, and would therefore act wisely in giving her child into the charge of another; for children in London are almost invariably injured by taking the smallest quantity of food during the day or night; their stomach is irritated, and their bowels become more or less deranged by it; while, on the contrary, infants are almost always well if fed solely upon a healthy woman's milk. It is very undesirable to give an infant food of any kind, but if circumstances preclude the *possibility* of procuring a healthy nurse when a mother's milk declines, the best plan is to alternate feeding and giving the breast every third hour, but on no account to make up at any meal by food what appears to be deficient in the milk. A woman always knows whether she has enough for her child; if she has not, let her not attempt to suckle, but feed the child, and probably when the next three hours have come round she may be provided with milk; at all events the rule should be, either suckling or feeding once in three hours, but not both.

The quantity and quality of food to be given under such circumstances is next to be considered. The quantity should not exceed three ounces; the quality should as nearly as possible be assimilated to that of a woman's milk. Ass's or goat's milk, with a little water, is the best substitute; but as it is difficult to procure either of them in London, some other article of diet must be used. A jelly made of prepared-barley, thinned with a little boiled milk, seems to agree well with most children, in the same quantity—viz.,

three ounces. It should be mentioned, however, that in a few rare instances weak animal broths, such as veal or chicken broth, seem to agree best with some children, and therefore no absolute rule can be laid down.

Sleep.—Infants require a great deal of sleep. If they be in good health they will sleep the greater part of their time during the first month of their existence, and should afterwards be allowed to do so several times in the day, but they should be kept long enough awake to oblige them to sleep at night. An infant may easily be taught to sleep at regular intervals during the day, and for six successive hours during the night; for healthy children are so much the creatures of habit that they will readily fall into a regular system of this kind, and will not look for food until an early hour in the morning. If a child lies awake at night, it is a proof that either it is really ill, or has been brought up with bad habits. Sleep, it is remarked, contributes as much to the growth of a child as food, because in that state digestion goes on more perfectly, and the powers of the body are recruited and refreshed. But this is true of natural sleep only; that which is procured by rocking has a very different effect, for it is the result of a species of drunkenness, or congestion of the brain;—rocking should therefore be altogether prohibited in a nursery.

Atmosphere proper for infants.—It is of great consequence that the atmosphere in which a child lives should be pure and often renewed, that it may not receive into its lungs air which has lost its vital properties by having been frequently respired, or which may be impregnated with gaseous matter of a deleterious or disagreeable quality; for this purpose it is desirable that the nursery should be an airy, spacious room, and, if possible, possessing a southern aspect,

and accessible to the rays of the sun. Very hot rooms are extremely injurious to infants, causing them to perspire to an excess which renders them so sensitive that they catch cold upon the slightest exposure, and supplying their lungs with an atmosphere which is unfit for the purposes of respiration. Children, however, suffer still more from cold. The experiments of Mr. Edwards prove that a young animal loses its temperature much sooner than a full-grown one, and has less power of reproducing it. This explains why lambs, calves, &c., brought forth in severe weather will die if they are not kept very warm; and why a much greater proportion of infants die who are born in winter than of such as are born in summer. Even in adults, the warmth of the surface of the body is so essential to perfect digestion, that the very simplest things are found to disagree with the stomach when the skin is chilled. We cannot wonder, therefore, that in infants, whose circulation is feebler, the function of digestion should be still more affected by cold; and it should be remembered that, from the delicacy of their structure, they will suffer from a degree of cold to which an adult is quite insensible.

The argument usually brought forward against the necessity of keeping infants warm is, that young animals who are exposed in the forests to the frost and snow of winter, without any protection whatever, are much stronger and more vigorous than those who are domesticated; but the truth is, that the tender and delicate ones are killed by the intensity of the cold, and none survive but those whose constitutions are strong enough to withstand the inclemency of the weather.

But though we are contending for the absolute necessity

of defending infants from the cold, we would warn mothers against attempting to do so by confining them in heated rooms, or in the house, and not permitting them to go out. The warmth of surface which is conducive to health is that which is produced by carefully covering the body with warm clothing, leaving no part of it, except the head and face, exposed. An infant properly clothed may be taken out every dry day with great advantage, and will be rendered hardy and vigorous by the cold air; but if it is carried even about the house with the neck and arms uncovered, the child's health will be injured, and the purple hue of its skin, and its general aspect, will manifest the discomfort of its feelings. If a mother really loves her child, let her explode short-sleeved dresses from her nursery altogether, and not allow her infant to be tortured for the gratification of shewing its fat rounded arms, and pretty neck. Consumption and scrofula in every frightful form, which are so frequently attributed to the changeableness of our climate, may, with much more reason, be said to owe their numerous victims to exposure to cold through the impropriety of their dress in early years.

An infant should never be kept lying either on the nurse's knees, or in her arms, without having a pillow under it; the unevenness and hardness of the surface on which it retss is often injurious to its delicate skin, and no advantage whatever is gained from the practice. Another great objection to accustoming a child to this kind of nursing is, that it becomes disinclined to lie in bed, so that an attempt to keep it there, when perhaps the preservation of its life renders it necessary, proves a source of fretfulness and misery, instead of bringing on quietness and repose. Nothing is more common than to find children

suffering under dangerous eruptive diseases, inflammation of the chest, or some other disorder for the cure of which warmth of the surface of the body is essential, and yet from bad habits they cannot be induced to remain in bed; whereas children who are well-trained, by being accustomed to their proper place, submit themselves quietly to every necessary direction, and are therefore much more easily cured. The proper abode for an infant is a warm cot. At a few weeks old it may, when awake, be occasionally laid on a little pillow or mattress in a low basket, which may be placed at the nurse's side, or set on a rug before the fire if the weather should be exceedingly cold.

The custom of carrying children on the nurse's arms which prevails so generally, is a very injurious one. Consult nature on this subject. Look at an infant when an attempt is made to set him upright; his back is bowed down, his head falls forward resting upon his chest, and his whole appearance shews that the attitude is painful to him. Mr. Haden says, that some medical men are of opinion that the prominent breast-bone and narrow chest so frequently seen in weakly children, are produced by the manner in which they are kept leaning on one hand of the nurse and sitting upon the other, as the impression of her thumbs may be found on the ribs; observing, that any person who will take up a child so affected in the usual way—embracing the chest with his hands—will perceive, that his thumbs will naturally fall into artificial hollows made by previous pressure on the ribs, on each side of the breast-bone. This idea may be far-fetched, but there is no doubt that this mode of carrying a child is productive of bad effects. The supposed utility of having a child continually in the nurse's arms is, that it assists in keeping it

warm, and obliges her to give it exercise; but warmth will be more certainly secured by adequate clothing and a proper temperature in the nursery, and the child will have much more and better exercise by its own exertions than by the interference of a nurse.

If we reflect a moment upon the condition of the body of an infant, we can have no hesitation in deciding upon the position in which it ought to be kept. The bones, or what are afterwards to become bones, are composed principally of cartilage, and contain but a very small portion of earthy matter. Those of the back are amongst the least ossified, they are consequently flexible and elastic at this period of life; and the muscles are feeble and unable to sustain any great weight. An infant is therefore physically incapable of keeping its body erect; and his back is bent, and his head hangs forward, whenever he is placed in a sitting posture. The bowing of the legs, projecting shin-bones, and curvature of the spine, which are so often met with in delicate children, arise, one and all, from the foolish habit of putting them upon their feet, and trying to make them walk, before the bones have acquired sufficient firmness to support the body: like every other substance which is unable to bear the superincumbent weight, the bones bend, and thus the various kinds of deformity just alluded to are produced. The proper position for infants is evidently the horizontal one, and it should be maintained even when they are taken out of doors. This may easily be done by placing them upon a piece of light wood or strong pasteboard, covered with a small hair or wool cushion, which may be borne by their attendant without inconvenience. When a child shews a disposition to move his limbs, let him be laid on the floor, where he will, by degrees, find out

the way of exercising himself. A child is the best judge of his own powers. As soon as he has really gained sufficient strength to sit upright he will feel conscious of it, and will assume the attitude of his own accord. After a while, he will raise himself by the help of a chair or other object near him, and stand upon his feet, and in a short time more begin to walk. These are indications of nature which we may follow up without fear. When a child spontaneously sits up, no harm will arise from carrying him about in that position; and when he takes to pedestrianism without being urged to it, we may be sure that it will not hurt him to lead him a march. And we need be under no apprehension that these capabilities will lie dormant; their development is a matter of course; children gladly exhibit them as soon as they can; and those who are thus left to themselves are never deformed.

It is the custom in some nations to act on these principles. Hindoo nurses allow their children, when they are old enough, to roll constantly on a mat, or place them on the ground with a quilt under them. If they are brought into a room, or moved from place to place, they are carried upon a tray; and they are seldom, or never, borne in arms. When nursed in this way, they are said to acquire the use of their limbs much earlier than when they are brought up in the manner usual amongst us. At four months old they can raise themselves from the horizontal position, and sit upright; at between nine and ten months they teach themselves to stand on their legs, and very soon learn how to travel round the room from chair to chair.

The function of the skin is one of great importance. Insensible perspiration not only preserves it in a healthy state, but is one great outlet by which the superfluous fluids

of the system may be eliminated. Its pores should therefore be kept free from obstruction, and its minute vessels strengthened as much as possible, in order that it may resist sudden impressions of cold. These objects are to be accomplished by cleanliness and friction.

Infants should be washed twice a day in warm water, and their skin be wiped perfectly dry with a very soft linen cloth. The whole body should also, after each act of washing, be warmed and stimulated by gentle friction. Cold water will not remove the oleaginous secretion which gathers upon the skin of very young children, and therefore should not be made use of for that purpose. As they grow older, the temperature of the water may be gradually reduced, until it can be employed quite cold. When cold water can be safely used, it will be found beneficial in diminishing the irritability of the skin, and rendering it less liable to the morbid influences of cold ; it will also excite that reaction of the extreme vessels which will preserve them in a healthy state. In general, the use of cold water followed by friction, will cause quick reaction, and produce that fine mottled appearance of the skin which is the hue of health in children. But where they are weakly the employment of cold water is not safe. If it should be found that reaction and a permanent glow upon the surface of the body is not speedily produced, and if, on the contrary, the infant appears languid and heavy, and its skin remains pale, shrunk, and bloodless, cold water should be abandoned, and tepid water employed ; and friction of the surface of the body should be still more particularly attended to, in order to increase the activity and strength of the extreme vessels.

Excoriations of the skin, which are so painful and teazing

to children, arise from the secretion not being carefully removed by washing, or from the skin being left damp. Attention to the directions above given will effectually prevent their occurrence. Dusting the skin with flour or hair-powder is now generally resorted to for the purpose of absorbing the moisture which is left after washing; but this is a bad substitute for drying it with a soft cloth. I have lately seen a child with extensive excoriations of the skin in the folds of its neck, which was dusted over with zinc powder, and was daily getting worse. I told the mother that want of cleanliness was the cause of the child's suffering, which gave her great offence; but, at my suggestion, she washed the neck regularly with warm water, and brought it back in four days with the skin perfectly sound. Let one example suffice.

Cleanly habits in children.—Great care should be taken by the nurse that an infant should not long have anything wet next his person. His napkins therefore should be changed as often as they require it; and, at the same time, the skin should be washed with warm water, and afterwards be wiped so perfectly dry as to leave no occasion for the use of powder. Children may be trained to habits of personal cleanliness more easily and at a much earlier age than is generally supposed. Few nurses have discovered that by holding out a very young child it may be taught to pass its evacuations periodically, though they plainly see it may be trained to sleeping and looking for its food at certain hours. Dr. Underwood mentions one lady who held her children over a pan from the time they were a month old, and at the end of three months they used it with great regularity. Infants wet themselves very frequently; but it will be found that this is done at

tolerably regular intervals; and therefore the period may be anticipated, and the child may be held in the proper position until the evacuation has taken place, when he should immediately be removed. He will thus soon learn to connect his being held out with the purpose for which it is done. If the nurse would steadily follow this plan, a child would wait until he was held out before he performed his necessary evacuations; and thus infants would be dry and comfortable, not only by day but also by night; for an infant so taught would invariably awake and give notice of his distress by crying before he yielded to the impulse of nature; and if he were then taken up, held out, and immediately afterwards laid down again, his rest would not be much disturbed, and a cleanly habit would soon be perfectly and permanently acquired.

Exercise out of doors necessary.—A great deal of the unhealthiness of children in London is to be attributed to their being kept so much within doors. In fine weather, infants should be taken into the open air,—in summer, the first week after birth, and in winter at the end of a month, and every day afterwards. Nor is it enough that they should remain abroad for a few minutes; their time should almost be divided between sleeping and being out of doors. Fresh air is essential to health; it composes them; makes them feel comfortable; and on returning they fall asleep as a matter of course. Young children should not be shaken or tossed about. They are frequently frightened by being suddenly thrown up in the air, and continue afterwards nervous and afraid of falling; and their animal frame is not constituted so as to bear the internal disturbance which is excited by such rapid and violent motion. Friction as a substitute for exercise is recommended by all writers on the management

of young children, as being highly conducive to their health. This may be done either with the hand or a flesh-brush; and at each rubbing the operation should be continued till warmth of surface is produced.

These rules are by no means new. They have for a long time been recommended to the public by men of the greatest experience and eminence in their profession; and, considering how simple and easy of observance they are, it is a matter of surprise that they should be so little acted upon. The office of a nurse, as children are generally brought up, involves personal sacrifices of so burdensome a nature, and so seriously interferes with the discharge of a woman's relative duties, that many very well-disposed mothers shrink from undertaking it. A woman must devote her time almost exclusively to one infant, whilst her husband and the rest of her family are comparatively neglected; and, except when the child is asleep, she can enjoy little or no respite from suckling it, in order to stop the incessant cries with which it will otherwise harrow her feelings. The night is still more formidable than the day. The child lies by her side either exhausting her by continual sucking, or annoying her, and breaking her rest, by its vomiting and other offensive practices. If placed, as it should be, in a cot, still she cannot calculate upon an hour's undisturbed repose; for the child sleeps unsoundly from uneasiness of stomach, and sets up a cry the moment it awakes, from which it will not desist till its mouth is stopped with the breast. Of course the morning finds her weary from want of sleep, and languid from the loss of the quantity of milk which her body has sup-

plied;—a fearful wear and tear of temper and constitution, which the day furnishes no means or opportunity of making good. When we consider the uncomfortable feelings which must attend such a state, we cannot wonder at the reluctance of mothers to bring themselves into it, or that nurses who are not prevented by strong principle should have recourse to gin and other mischievous stimulants for their relief—a habit destructive to their own life and highly injurious to the health of the child.

Were any adequate good to be obtained for the child by the endurance of such weighty grievances, we would encourage mothers to regard them with that becoming complacency, and bear them with that patient fortitude, which seldom fail them in the encounter of necessary evils. This, however, is far from being the case. As a consequence of the present system of management, the children grow up with a feeble body and pallid countenance, undisciplined in temper and in habits, a trouble to their parents, their attendants, and themselves, and ready to fall victims to any violent disease, the mind of the parents being at the same time oppressed with constant anxiety on their account. Let, therefore, mothers be once more exhorted to frame their system according to the regulations which have here been collected; and let them again be assured, that if they will in this manner train their offspring to proper habits, they will not only themselves be free from a great part of the discomfort and unhappiness which, as nurses, they now suffer, but will have the satisfaction of seeing their children well-formed, blooming, and robust, contented themselves, and affording pleasure to all around them.

SECTION VII.

ON THE MODE OF BRINGING UP INFANTS BY HAND.

To mothers who are unable to suckle their children, and who either cannot afford the expense of a wet-nurse, or have strong prejudices against them, a few directions as to the best mode of feeding children will not be unacceptable. For if an infant be weakly, and the care bestowed upon it be not both judicious and unremitting, the attempt to bring it up by hand is almost certain to end in the loss of its life; but if appropriate food be substituted for milk, and great attention be paid to its clothing, cleanliness, and regular exercise in the open air, a child with a tolerably good constitution may be reared by hand. Soon after its birth a little mild purgative medicine—and nothing seems better than castor oil—should be given to it, because it is deprived of the aperient which nature has provided for it. If the proper diet for an infant be its mother's milk, the best substitute is that which resembles it most in its qualities and properties. The infant body is designed by nature to receive nourishment in a liquid form only; bread and milk, panado, and all thick substances, must therefore be very injurious, inasmuch as they are so very unlike its natural food. The human milk, when drawn from the breast, has exactly the same bluish appearance as cow's milk when the cream is taken off; it affords a good deal of cream, and but a small quantity of curd, whey constituting the chief part of it; but the more healthy a woman is, particularly if between the age of twenty and thirty, the more cream her milk contains, and the more abundant is also the curd. Ass's milk is generally allowed to be the

nearest to the human. It consists mostly of whey, and has less cream and curd in it. Goat's milk throws up a great deal of cream, and contains more curd than that of any other animal. Cow's milk appears to be the richest and most nourishing of those in general use; it contains a great deal of cream, though less than a woman's, but it produces more curd. Ass's milk is the best substitute for human, but as it cannot be easily procured in London, food of some other kind must be resorted to. Prepared-barley gruel thinned with cow's milk, rennet-whey, or thin gruel well strained and slightly sweetened, answer tolerably well in the early months, and many children have done well when fed with cow's milk and water—in the proportion of two parts of the former and one of the latter—and a little sugar. Delicate children are apt to throw it up, in a curdled state, almost immediately after it has been taken; but, unless they are greatly overfed, this may be prevented by the addition of a little salt to it. Dr. Hugh Smith ascertained by experiment that salt had the property of preventing milk from quickly curdling. He put two ounces of milk warm from the cow into a tea-cup with a little common salt, and the same quantity into another cup without salt. The addition of a very little distilled vinegar immediately produced a curd in the milk which had no salt in it, but had little or no effect upon the other. He tried the same experiment with a large teaspoonful of rennet: the milk which had the salt in it continued in its fluid state, the other grew turbid, and almost instantly separated into curd and whey.

At a more advanced age, or when some teeth have appeared, the consistence of the food may be increased by the addition of arrow-root, baked flour, or biscuit-powder,

without inconvenience to the infant. Food prepared from lean meat, such as beef-tea, and veal or chicken broth, often agrees with very weakly children, when preparations from vegetables have been found to disagree; and broth or beef-tea mixed with milk often suits children very well. No rule, therefore, can supersede the necessity of a careful and daily observation of the state of the child from the effects of the food. Whenever the stomach or bowels become disordered, and vomiting or purging are brought on, the food should be immediately changed; but food in a solid form should never be given, until the gums are provided with teeth to masticate it. "The practice of giving solid food to a toothless child," says Dr. Clarke, "is not less absurd than to expect corn to be ground where there is no apparatus for grinding it. That which would be considered as an evidence of idiotism or insanity in the last instance, is defended and practised in the former. If, on the other hand, to obviate this evil, the solid matter, whether animal or vegetable, be previously broken into small masses, the infant will instantly swallow it; but it will be unmixed with saliva. Yet, in every day's observation it will be seen, that children are so fed in their most tender age; and it is not wonderful that present evils are, by this means, produced, and the foundation laid for future disease. The power of digestion in infants is very weak, and the food designed for them, in the earliest period of their existence, by the Author of Nature, contains but a very minute quantity of nutritious matter, diffused through a large quantity of water, yet quite sufficient for all the purposes of life. It is taken very slowly into the stomach, being procured by the act of sucking, in which a great quantity of saliva is secreted and swallowed with it. Nothing can be

more contrary to this, than to stuff a child's mouth and stomach with solid, perhaps animal food, or even to pour down its throat, with a spoon, milk and bread, or any other solid matter, without sucking, mastication, or the secretion of saliva."

The mode of giving children food is a matter of great consequence. It is obviously wrong to put a large boat-full of any kind of food into their mouth, forcing them to swallow the whole of it in a very short time; and then, in order to satisfy them, to ply them with a second, which is no sooner down than it is thrown up again. Grown persons very frequently suffer from devouring their food too quickly. Any one may be convinced, by making the experiment, that a very much smaller quantity than he generally takes, *if eaten slowly, and well masticated,* will suffice him for a meal; and that after such a meal he will feel more comfortable, and may attend to business or to pleasure with greater ease than after an ordinary one. A hearty meal, eaten in a hurry, distends the stomach, and produces indolence and a tendency to sleep. Feeding a child as it is often done will have the same effect. We should carefully observe and imitate nature. In the action of sucking, the muscles of the mouth, tongue, and fauces force out a considerable quantity of saliva, with which every portion of the milk, which flows slowly, is well mixed before it is swallowed. This admixture of the saliva with the child's food seems indispensable to its proper digestion. The best mode, then, of administering food to an infant seems to be, such as requires it to make a similar exertion to that used in taking the breast, namely, by giving it out of a sucking-bottle, stopped with a bit of very fine sponge covered with soft leather. If given very slowly, a much smaller quan-

tity of food will satisfy an infant, than when it is fed hastily by the boat or spoon.

The temperature of the food should be about that of new milk; the quantity should not exceed three ounces; and the intervals between the feeding should not be less than three hours. Many children will do without food for four hours. The child should be fed late in the evening, and taught to sleep through the night, as was directed in the section on the manner of nursing; and all the instructions as to exercise, clothing, &c., given in that section should be carefully observed. Until the gums are supplied with teeth, the smallest portion of solid food should never be allowed; but when a few teeth appear, the child may occasionally have a piece of meat to suck.

SECTION VIII.

ON TEETHING.

The period of teething is anticipated with apprehension by most parents, from the train of evils usually attendant upon it. It commences generally at the end of the sixth or seventh month after birth, when the teeth begin to press upon their capsules, and ulcerative absorption of them, and of the covering gum, takes place. The two innermost of the incisors of the lower jaw appear first, and are followed, at an uncertain interval, by the corresponding incisors of the upper jaw; but the child is a year old before the eight incisors are to be seen, and two years old before the whole twenty milk teeth have cut the gum. If the infant be in a weakly state from improper diet and confinement to the house, teething is always a process of danger to it; for a year and a half, therefore, the life of such a

child must be uncertain, and the parents must be kept all that time in a state of anxious suspense. If, however, the child be strong and healthy, neither too fat nor too thin, nor susceptible of taking cold,—in other words, if he have been *properly managed during the preceding months*,—teething causes but little inconvenience.

When the teeth begin to press upon their capsules, the child generally loses its appetite, and becomes cross and restless, and bites its fingers, or any toy it may have in its hand; its mouth is exceedingly hot; its gums are swollen and painful; tongue white; skin dry, and hotter than natural; some degree of fever is always present, and the bowels are deranged. In severe cases the fever is violent; the cheeks are deeply flushed; the child is very cross when he is awake, and starts suddenly when he is asleep; the bowels are purged; a greater flow of blood to the head than is natural often takes place; and inflammation of the brain, or hydrocephalus, comes on. When symptoms like these occur, it is necessary to restrict the child to a very small quantity of food. If he be living entirely on the breast, he should not be allowed to suck as often as before:—once in four hours will be amply sufficient. If he be partially weaned, all food but the breast-milk should be interdicted; but if actually weaned, barley-water or rennet-whey should be his only food, until the symptoms have in some degree abated. Purgatives should be given; some of those medicines which are calculated to diminish the heat of the skin, and reduce the pulse, such as antimonial wine, ipecacuanha wine, hydro-cyanic acid, &c., should also be administered in small doses until fever is subdued. If the child be much purged, it is not desirable to aggravate that symptom by aperients: it may often be relieved by anti-febrile medicines; but as a

general rule it should not be checked by opium. Much difference of opinion exists as to the propriety of lancing the gums when they are greatly swelled and inflamed. The object of doing so is, to cut through the membranous capsule which covers the tooth, and thus to put a stop to the fever and irritation caused by the pressure of the tooth against it. The objection which is made to the performance of this operation is, that if the tooth be not sufficiently advanced, the gum only will be cut, and not the capsule; and the cicatrix, which is formed after the healing of the wound thus made in the gum, is so hard that it presents a greater impediment to the eruption of the tooth than the gum would otherwise have done. But this objection is not to the cutting of the gum, but only to its being done ineffectually, and at an improper time. If therefore the child be excessively feverish when cutting his teeth, the gums swelled, and the mouth very hot, the safest course is to cut the gums, only taking care that the capsules be cut perfectly through, and the top of the tooth laid bare, by an incision made in the form of an X; for if the capsule be not cut through, little good will be effected by cutting the gums, as the irritation will still be kept up by the pressure of the tooth. If the fever be simple, and no organ of the body inflamed, it will subside generally when the source of irritation is removed, and in a short time the tooth will appear. But as organic diseases, and especially inflammation of the brain, occur more frequently during the process of teething than during fever from any other cause, too great watchfulness cannot be employed for the detection of any disease which may be insidiously creeping on. If the child's face is flushed,—if he is at once irritable and sluggish, fretful and heavy, the eyes unable to bear the light, and the pain of

the head increased by moving or shaking it, there is much cause for apprehension, and measures ought to be promptly adopted to relieve these symptoms. The more marked indications are so evident, that they will certainly attract the notice of the nurse or attendant; it is those that are more insidious, and less obvious, which I wish to point out here, in order that parents may not neglect the first appearances of an affection which daily destroys a large number of children. Complaints will not be made, nor symptoms of disorder be exhibited by children, unless they are suffering from some cause; the slightest indications, therefore, ought to be attended to. It should, however, be borne in mind, that strong children cut their teeth without pain or inconvenience; and this alone seems a sufficient reason for bringing them up in the way pointed out in the foregoing sections.

SECTION IX.

ON WEANING.

It requires the most careful management to make a change in a child's food without exciting some disturbance in its constitution, whatever may be its age; but if it be attempted before the front teeth have appeared, it is often productive of very dangerous consequences. The sudden substitution of artificial food for breast-milk, when an infant is not prepared by a change in its physical condition to receive it, irritates the alimentary canal, and produces vomiting, purging, and green-coloured evacuations; the child grows restless and feverish, and after a time becomes exceedingly emaciated. This state has been described by Dr. Cheyne under the name of "Weaning brash, or *Atrophia ablactatorum*," and destroys a very great number of chil-

dren. The proper period for weaning a child is after the eight front teeth have been cut, which happens at no definite age, but sooner or later, according to the strength of the child. In weakly children, the teeth appear later by several months than in the healthy and robust; but the presence of the teeth is the only intimation we can have that the child is fitted by nature for a different kind of food from that upon which it has hitherto lived; for until the infant has teeth, suction seems to be its natural mode of taking food. According as the different orders of teeth appear, then it may have a portion of that food on which animals live in whom any particular order is seen. When the incisors have cut the gum, the child may have something to gnaw; when the canine teeth are put forth, some animal substance to tear; and when the jaw is furnished with grinders, vegetable food.

But even after the teeth have appeared, the change of food, unless it be made very gradually, will derange the system, producing costiveness or purging, loss of appetite, a feverish state, or some symptom of indigestion. The most effectual remedy for these disorders is, to restore the child again to its nurse until the digestive organs have recovered their tone. If this cannot be done, let artificial food, of a consistence similar to the milk for which it is substituted, be given,—such as milk and water, rennet-whey, thin arrow-root, or thin gruel with a very small portion of milk.

The best mode of weaning a child, at whatever age it is attempted, is to make an alteration of its diet very gradually; first substituting one meal of some other substance for one of breast-milk, and restricting its quantity to three ounces at a time. When it is found that the health of the child does

not suffer from being fed once a day, a second meal may be given, and another of milk abstracted; and thus the number of meals may be gradually increased, and the quantity of milk gradually diminished, until the weaning is completed. The number of meals, however, should never exceed four in the day,—that is, in the twenty-four hours,—and they should always be given at stated periods. If the weaning be commenced before the child has cut its front teeth, the substitute for the breast-milk should be ass's or goat's milk, cow's milk and water with a very little sugar, or barley-gruel made of prepared-barley and thinned with milk; food in a more consistent form should not be given. But if no change is made in the food of a child until it is of the proper age, the quality of the food which ought to be given will depend very much upon the health of the child. If it be strong and vigorous, the first substitute for breast-milk may be roasted meat, cut thin and mixed with crumbs of bread. When the stomach has become accustomed to this, another meal may be given in the morning of bread and milk, with an intervening one of breast-milk. Should the child's health not be disturbed by this food, another meal of bread and milk may be given in the evening; and when the breast is taken away altogether, a fourth meal of arrow-root made with water will serve by way of supper. In the case of a weakly child, crumb of bread moistened with meat-gravy or good beef-tea should be given instead of meat; and for its first meal, barley-gruel and milk, or broth mixed with milk; the same for its third meal. The quantity of meat should not be more than two ounces with one ounce of bread, nor should the fluid exceed four ounces.

The quantity of food given to a child should be care-

fully regulated. If the stomach is overloaded, it will not digest at all, and its contents will be conveyed in a crude state into the bowels, and will irritate and disorder them. The condition of a child, however, affords a very clear indication of the quantity of food which ought to be given. If it be fat, three meals a day will be amply sufficient; but if thin, it will thrive better upon four light ones. Some writers recommend that children should have one meal of food as soon as they are four months old; but in London medical men seem to entertain but one opinion upon the subject, which is, that, until children have cut their front teeth, no food save the breast-milk should be allowed them. The only inconvenience I have ever known to arise from this practice is, that children become so accustomed to milk that they are very unwilling to take any sort of food; but it is only necessary to keep them without the breast till they are very hungry to overcome this feeling.

It is when children are making this transition from liquid to solid food that it is important they should be taught to take it slowly; to retain it long in the mouth, and masticate it well; and to swallow it gradually; and thus, if it be proper food, it will be digested and assimilated, instead of annoying the stomach and bowels. It is owing to bad habits formed at, perhaps, an earlier age, and confirmed at this, that many persons bolt their food unmasticated, and thus overburden their stomach by imposing upon it a task which it never was intended to perform.

These directions will not appear too minute to any one who is aware of the extreme danger to which a child is exposed from being weaned in a hasty or incautious manner, and who has witnessed the slight inconvenience

given, and the little injury done, to the health of a child by being gradually weaned.

SECTION X.

ON MANAGEMENT DURING CHILDHOOD.

The way by which a child may be conducted safely through the stage of infancy having been pointed out, it may be well to add a few observations upon its management during the period of growth. The great object should be to bring up both the intellectual faculties and animal frame to the highest degree of perfection of which they are susceptible, without strengthening the one at the expense of the other. The cultivation of the intellect does not come particularly within the scope of my present purpose, but I may remark incidentally, that although, on the one hand, a thriving and healthy state of body may, no doubt, be attained without any education of the mind, it is true, on the other, that the mental powers cannot be fully developed, and properly and permanently used, apart from a sound and vigorous condition of the corporeal frame.

Now, in order that the body may grow, and that the bones may be firm and able to sustain its weight without bending, and the whole system be well composed, there must be supplied an adequate proportion of materials in the form of wholesome and nutritious food;—that the muscles may be strong and well developed, they must be exercised;—that the stomach may be disposed and enabled to perform its office of receiving and digesting the food, it must be stimulated by fresh air, and all impediments to its action be studiously avoided;—and that the function of the skin in secreting and perspiring may be fully and uninter-

ruptedly performed, the surface of the body must be cleansed, by frequent ablution, from the deposition which is constantly formed upon it from within and from without, and the same object must be further promoted, and the operations of the stomach and of the rest of the internal machinery be forwarded, by clothing the body warmly, and regulating with judgment the occasional exposure of it to cold water and cold air. I proceed, therefore, to make a few observations upon each of these points.

In the feeding of children care should be taken to teach them the old proverb, that they "eat to live, and do not live to eat." Food, wholesome and proper, should be provided for them; but the kind ought to be to themselves a matter of indifference; for many children, and even grown people, die, from not being able to take farinaceous food during severe illness. Meat, in moderate quantities, may be given to children once a day; but those who reside in London appear to be oppressed by taking it every day, and to thrive better upon fish or pudding two or three times a-week. Healthy children may take a certain proportion of farinaceous vegetables with their meat; and pudding may be sparingly added after a proper quantity of animal food; but pastry is very objectionable. As a general rule, it may be remarked, that children who are fed upon a certain proportion of animal food will possess a better constitution, will have the muscles stronger and better developed, and will be more capable of resisting the attack, or bearing up under the power, of disease, than those who live wholly upon a vegetable diet. The countenance of a person who takes no animal food is sallow, his flesh is flabby, he is feeble and unequal to much exercise, and bears up hardly against disease. Too much animal food,

on the other hand, produces plethora, destroys the appetite, and arrests the excretion of bile. Fish, fowl, veal, and white meats in general, are less digestible to a *healthy* young person than beef or mutton; but more digestible if the stomach be feeble and languid. The same may be said of boiled meats. Meat dressed a second time is, for the most part, an unfit food; minced meats and hashes are therefore to be avoided. It should be remembered that children are always disposed to eat too largely. To prevent this, they should be closely watched, and not be permitted to eat so much as to produce drowsiness or distention of the abdomen. A child may have a great appetite, and, in a certain sense, a strong stomach, but feeble power of digestion: the quantity of food should depend on the degree of this power which, by observation, it is found to possess. The morning and evening meal may consist of a quarter of a pint of liquid composed of boiled milk, and tea coffee or cocoa, half and half, with bread; but no butter, honey, or sweetmeats, should be given, or any other stimulus that may act as an inducement to eat more than enough.

The proper time for exercising children is *before, and not after*, meals. The well-known experiment of Sir Busick Harwood, made upon two dogs, has proved that exertion interferes with the process of digestion, but that quietness and rest promote it; and, indeed, every one knows from experience how inconvenient exercise is after taking a full meal. Children, therefore, should not play violently, or run about after having eaten; and the injurious custom so prevalent at schools, of having play-hours after meals, ought to be discontinued. Half an hour at least should be assigned to children before each meal for taking exercise. The kind of exercise suited to any particular child must depend

entirely upon his strength; a top, a hoop, or a ball is sufficient for children at an early age; as they grow older and more vigorous, running, leaping—but not from a height—cricket, fives, gymnastic exercises, &c., may be allowed; and where no opportunity is afforded for such exercises, pulling a bell or working at a pump may be substituted, as they require the action of a great many muscles. It is unwise to compel weakly children to partake of the same exercise as those who are robust, as, instead of finding it a pleasure, they will be fatigued by it;—and exhaustion, not strength, is the consequence of fatigue. The better course is to allow children to judge of their own powers, discouraging indolence, and encouraging to exertion, but leaving them at liberty to rest when they feel tired; and as the body becomes invigorated, the degree of exertion may be increased. The measure for exercise is that which does not produce fatigue; and the proof that the body requires more is the appearance of chilblains and other maladies, which are the effects of languid circulation, and which never will appear, provided, in addition to being exercised, the body is sufficiently clothed. But no abstract rule can be laid down which will take away the necessity for the constant use of observation and judgment on the part of parents, or those who have the charge of children.

There are very few days in which healthy children may not be allowed to go out in spite of wind, storms, or cold; but in such weather they should not remain out long enough to become chilled, or over-fatigued. Feeble children, however, should not be exposed to bad weather, and when they return from a walk, their feet should be rubbed till they are warm as well as dry.

It may be laid down as an axiom, that a child cannot be

healthy if his skin does not perform its functions properly; and it is requisite to put this in a dogmatic form, because so little attention is generally paid to it. It is a very common notion that children should not approach the fire when they are going out,—that they should go out cool; but the injudiciousness of this measure may be judged of by every one who will observe the difference of his feeling when he goes out cold, and when he goes out warm, on a very cold winter's day: in the one case, violent exertion must be made to render the body completely warm; in the other, a moderate degree of exertion will suffice to preserve its warmth. Instead, therefore, of seeing that children are cool when they go out, the greatest care should be taken that they are warm on leaving home, in order that the cold may not be able to abstract too much caloric from the system.

It is a very great mistake to suppose that cold is healthful; on the contrary, the number of deaths is always in proportion to the severity of the weather, being invariably least when the weather is mild. Nevertheless, occasionally, moderate cold, proportioned to the vigour of the system, is favourable to the strength and comfort of those who are able to bear it; it contributes to the tone of the muscular fibre, increases the appetite, and improves the health: but intense cold can be borne only by very robust and healthy children, and that merely for a short time; for even they, if subjected to it long together, or when they are fatigued, will be injured by it; and to feeble children, under the same circumstances, it will prove fatal. The invigorating effect of cold can only be obtained by keeping the body warm with clothing, and, if possible, exercise, during the time that it is exposed to it.

Children should be washed every night in warm salt and water, which not only stimulates and strengthens the skin, but cleanses, and removes the secretion which forms upon it, more thoroughly than can be done by cold water alone. Washing in the morning is also good, but the indiscriminate use of cold water for that purpose is very improper. The temperature of the water should be regulated by the vigour of the child's constitution. For those who are strong, and in whom it produces quick reaction and an immediate glow of warmth upon the surface, cold water is very useful, strengthening the skin, and rendering them less susceptible of cold; but it should never be employed for those who are chilled by its application.

The cold bath and sea bathing are very favourite measures for children, with a view to strengthen the system; but they should not be employed for such as are sickly, nor for those in whom they produce chillness, drowsiness, or languor: neither are they proper in very damp or cold weather, because the skin is then most liable to the influence of cold.

The prevalent opinion, that it is dangerous to go into a cold bath when the body is warm, is most erroneous. The reverse is the case: it is exceedingly dangerous to do so when the body is cold. A sudden immersion in cold water will always produce reaction, provided the body has been heated by exercise *continued for a short time only;* but if the body has been exercised so long as to be fatigued, and has been suffered to lose its high temperature, the cold bath will not be followed by reaction, but by a determination of the blood inwards. The skin will be shrunk and chilled, and its appearance pallid and blue. The best time for a cold bath is the morning, or between

breakfast and dinner. It is very unsafe to bathe when the stomach is distended with food, and it is desirable that it should not be quite empty. Delicate children should therefore take a little hot liquid before they go into the water; and the best mode of using the bath is to exercise strongly from that time till perspiration begins to break out, then to plunge in and come out as quickly as possible; and exercise should afterwards be again taken till gentle perspiration comes on. The operation of undressing and dressing ought to occupy a very short time, and should be performed in a warm room: and the application of cold water, to be useful, should always be sudden and of short duration.

The dress of a child should be such as will maintain the whole surface of the body in a state of agreeable warmth. This can only be done in cold weather by substances which are bad conductors of heat, and which therefore prevent the caloric from passing off. In winter all children should wear either flannel or fleecy hosiery, and in no season of the year should their arms or neck be uncovered or exposed. If children are warmly clothed, exposure to the vicissitudes of the weather braces the skin and increases the power of resisting cold, and all other morbid agents. Digestion is also materially promoted by warm clothing, and, indeed, cannot be perfect without it; and if any failure occur in this function, the health of the child must certainly be injured. It is painful to a medical man to hear a mother say that a child is perfectly well, when he cannot but perceive by its cold blue skin and the expression of its countenance, that, from a cause which neither itself nor its attendants understand, it is in a state of suffering which it cannot

explain. The eye of an experienced gardener detects in a moment the declining health of a plant by the dryness and absence of that rich luxuriant green which characterizes a state of health, and promptly takes measures to remove those causes which produce this change in its appearance, not waiting for the withered leaf to show that disease has taken a deep hold. Just so the medical man discerns in the shrunken appearance, coldness, and diminished vascularity of the skin, the certain indication of the failing state of a child's health, and would, if he were permitted, promptly remove the cause, by covering it more warmly, increasing its exercise, and exposing it more frequently to the open air. But he is silenced by the assurance that the child is perfectly well, and is constrained to retire, though conscious that an attack of inflammation may be expected at any moment, and certain that the child's nutriment and growth cannot fail of being seriously affected by the state in which it is kept. If parents could but see with the eyes of medical men, they never would, merely for the sake of fashion or vanity, expose their children to such imminent danger as it is their common custom to do.

It should be carefully borne in mind that scrofula may be induced in the healthiest child, by errors of diet, clothing, and general management, though the parents may never have laboured under any scrofulous taint; and that the commonly received notion that it is an hereditary disease, is, in the majority of instances, a vulgar error : and on the other hand, that the children of really scrofulous parents may be rendered healthy by proper management, if the disease has not already taken hold of them. One of the most frequent causes of scrofula is cold; and in order to avoid it, children ought to be clothed so warmly as to make

them, in a great measure, independent of a fire in the cold season of the year. Animals brought from hot countries into this climate constantly die of some scrofulous disease, whatever precautions may be taken as it regards their food; and the habit of leaving the arms, legs, neck, and a great part of the chest of children without covering, not only exposes them to a perpetual risk of taking cold from any sudden blast of air, but, by chilling the surface of the body generally, prevents healthy digestion from taking place. It is only necessary to observe the general appearance of children brought up in this way, to be convinced that their digestion is materially affected by it: and I am particularly anxious to press this point upon the attention of all who have anything to do with children, being persuaded from extensive observation that many of the instances of affections of the joints, swelling of the glands of the neck, and inflammation of the chest, are to be attributed to the insufficient manner in which children, ordinarily speaking, are clothed.

END OF THE APPENDIX.

T. C. Savill, Printer, 107, St. Martin's Lane, Charing Cross.